# SOUTHERN POWER AND INDUSTRY

Ad lader mad 1984

DECEMBER, 1950

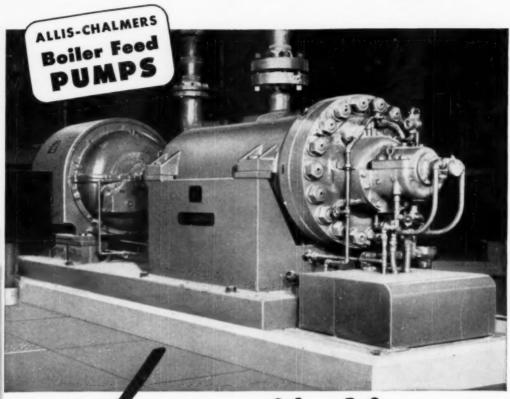
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Power Show



# *Install New* Boiler Feed Pum

HERE IS ONE OF THREE Allis-Chalmers barrel-type boiler feed pumps installed in one of the East's newest and most modern power plants. Pump is 5" x 5", 12 stage unit with capacity of 227,000 lbs/hr (480 gpm) against 1750 psig head. The motor is an Allis-Chalmers 800 hp 2-pole machine.

This pump was designed especially for the higher pressure ranges becoming more common in the newer plants. The internal split casing joint is held

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is immediately obvious so adjustment can be made before damage to the pump occurs,

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Above: Exterior view of the new plantmore modern and practicable than most.









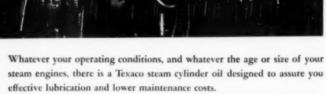




SOUTHERN POWER & INDUSTRY for DECEMBER, 1950

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Associate Editor

Hunter Hughes Regional Editor

M. M. Lyon

J. A. Moody Production Manager

### Business Representatives

- E. L. Rogers, 299 Madison Ave., New York 17, N. Y.—Phone Murray Hill 24959.
- Gerard Teasdale, 78 Manhattan Ave., New York 25, N. Y.— Phone Murray Hill 2-4959.
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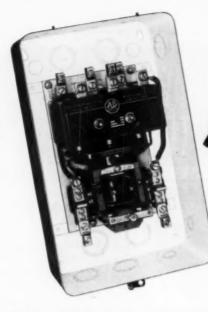
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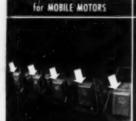
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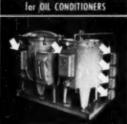
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# Facts and Trends

# FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

December, 1950

GROWTH OF THE FROZEN CITRUS CONCENTRATE INDUSTRY has been sensational with over 21 million gallons packed this season—a market value of about \$120 million. The boom has created a new and very important industry in Florida. In 1946 there were only 2 concentrate plants in Florida; by the end of 1950 there will be 15. First producer to market a commercial citrus concentrate pack was the huge Juice Industries Division plant at Dunedin, Florida. In this industry, like all others requiring large amounts of process steam, it is almost impossible to excel steam turbines for overall power and steam economy.

Feature article in this issue of SP&I, authored by W. H. Mouquin, Steam Turbine Division, Worthington Pump & Machinery Corp., Atlanta and B. C. Skinner, Vice President, Clinton Foods, Inc., Dunedin, Florida, describes how power generation from process steam improves overall economy in the Juice Industries plant. Article includes processing data in this booming industry and a detailed study which led to the selection of a 1250 kw geared turbinegenerator set of the automatic extraction non-condensing type.

TORQUE-ARM SPEED REDUCER of Dodge Manufacturing, designed primarily for conveyors, bucket elevators, feeders, processors, etc., has a torque arm which anchors the reducer and provides easy and quick adjustment of the V-belts through use of a turnbuckle. No sliding motor base or flexible coupling is required. It is not necessary to provide a foundation or other support for the reducer itself. Therefore, exacting job of lining up is eliminated. Just slip the reducer over the shaft, lock it in place, add oil, line up the sheaves, anchor and adjust the torque arm and it is ready to run.

CURRENT HEAVY CHEMICAL PRODUCTION is proving the value of Southern resources. The industry's growth in the South, however, has not been general, but has been confined principally to the manufacture of basic industrial chemicals, both inorganic and organic, and to the manufacture of plastic materials. The most realistic Southern advances will come as more Southern processors star; taking the products of these giant plants and finishing them ALL THE WAT into drugs, detergents, coatings, plastic products, etc., for the fast growing Southern market. THE POTENTIALITIES ARE LIMITLESS. See what chemical leaders are thinking and doing in the South, as currently reported in SP&I's summary of the recent Southwide Chemical Conference held in Atlanta, Georgia.

CONTINUAL CHECKING OF BEARING TEMPERATURES in rotating machinery by a new monitoring instrument (in laboratory stage) was reported by Minneapolis Honeywell at the Oklahoma City A.I.E.E. October meeting. Speed of scanning in such applications runs from one point every two seconds to ten points per second. Instrument, capable of scanning rapidly and continuously through 50 primary elements in less than 5 seconds, has an array of 50 bullseyes in place of scales.

Imagine that "one of these bullseyes lights up and simultaneously a howler sounds. Recorder immediately gives the following information: (1) Stator of generator number two has heated up to about ten degrees beyond proper operating temperature. (2) Actual temperature at 3:33 pm (present moment) is 218 F, eight degrees above preferred maximum. (3) All other temperatures and pressure in system are within safe operating range. (4) Information has been logged. (5) Same temperature will be recorded repeatedly until safe operation is resumed.

"By reading annunciator, operator on duty notes the generator involved and presses button to silence howler. He then inspects stator. Bullseye remains lit and recorder remains active, so he can watch temperature record. It drops back toward safe condition as operator increases water flow to hydrogen cooler. Light goes out and at the same time recorder runs downscale and stops."

SELF-CONTAINED WIRING SYSTEM called MI Safety Wiring, including conductors, insulation and a flexible seamless copper outer tube for protection is a new product of General Cable. Displayed at the October meeting of the Southeastern Electric Exchange in Atlanta, Georgia, cable insulation is magnesium oxide offering fire safety of a high degree. The stable mineral insulation remains unchanged by temperature, loads, or time.

Wiring material, available in sizes ranging from single conductor No. 16 up to 7-conductor No. 4 for voltages up to 600 v, is manufactured by assembling the conductors, insulation, and outer tubing in their proper relationship but in over-size dimensions. Entire unit is then rolled and drawn down to the desired sizes, the conductors, insulation, and outer tubing all being reduced in dimension but keeping their proper, desired relationship.

- 4000 LB CAPACITY POWER INDUSTRIAL TRUCK of Elwell-Parker has a hinged platform whereby platform length may be reduced almost 50 per cent. Length with forward end of platform raised is 84-in. Unit adaptable to older multiple story factories where material volume does not justify truck for each floor and where elevators cannot accommodate full-length standard type platform trucks.
- FIRE PROTECTION FOR GENERATING STATIONS is another of SP&I's special Reference Data Reports for plant engineers and operators. The special 8-page report in this issue discusses modern methods for controlling specific fire hazards, including advantages and disadvantages of carbon dioxide, carbon tetrachloride, foam, dry powder, fog, and water. Recommended protection for generators, transformers, switchgear, turbines, motors, roofs, etc., is presented.
- THREE-COAT MICA-BASE PAINT SYSTEM called "Coastal Finish", now being applied to Westinghouse pole-type distribution transformers, is designed to withstand the oxygen, acids, salts and alkalis found in seacoast and industrial atmospheres. First coat: zinc chromate combined with iron oxides in a suitable vehicle; second coat: mica flakes in a vehicle of modified phenolic and alkyd resins; and third, a special coating to screen out ultraviolet light from the sun. System is applied in same manner as standard finishes and in production is baked on. "Air-Dry" modified system is adaptable to field repairs.
- SANTA CLAUS now has one of his most important suppliers in a big plant South of Baltimore—the Santa Novelties Company of Savage, Maryland, making more than 60 per cent of the nation's glass ornaments for Christmas trees. Processes in this plant are arresting because so much of the work is accomplished by simple hand skills whereas nearly everything else in the glass blowing is made by machines.

It may be that this hand blowing and decorating will give way to more mechanical processes, but as it stands at present we see an industry which devises many unique gadgets used by hand labor and produces more than half of the gaudy trinkets that help make Christmas a showy and satisfying carnival.

PETROCHEMICALS ARE BOOMING in the Golden Horn along the Texas-Louisiana Gulf Coast, with more than 50 huge plants deriving diversified chemicals from the vast supplies of petroleum and natural gas in the area. An outstanding unit is the \$100 million Carthage Hydrocol facility at Brownsville, Texas. Three companies will participate in this process for the synthesis of gasoline and other liquid fuels from natural gas. Plant will make available a total of over 150 million 1b of various chemicals per year as by-products of the operation of the process.

Carthage Hydrocol, the key unit, takes in a huge stream of gas and oxidizes it to form some 7000 barrels of gasoline and oil products per day. At the same time, over 300,000 lb of crude mixed chemicals are produced and piped next door to Stanolind, who separates and refines the mixed stream into some 20 basic chemicals, including organic acids, alcohols, aldehydes and ketones. Refined chemicals are then transferred to a unit of USI, which ships them elsewhere for further processing and marketing.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.



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# Who Buys Boilers?

A quick answer is that VU-10 purchasers include industrials ranging from very small to the largest, as well as schools, hospitals, institutions, and, in fact, every type of establishment that requires boilers in the VU-10 capacity range. Why, then, limit the list of representative users on the opposite page to names known to everyone as among the biggest industrial enterprises in the country? Because such names form a significant guide for a prospective boiler buyer, in the same sense that the buying decisions made by operators of large truck fleets can be a reliable guide for the man who wants to buy a single truck.

This reasoning applies especially to the purchase of a boiler. Big companies buy boilers frequently . . . therefore their experience is always up to date. They buy them for plants in many locations, using many different fuels. They buy them in capacities from very small to very large. Their requirements justify the employment of highly qualified engineering spe-

cialists—both staff men and outside consultants.

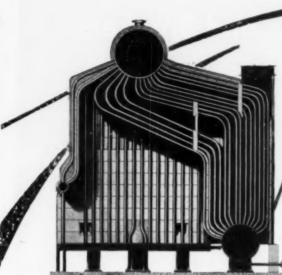
Thus they have the breadth of experience and the expert guidance requisite to making the soundest equipment selections.

And perhaps equally important, big companies tend to place more emphasis on long-term operating and economic results. They know from their own experience that daily operating economies accruing through the years from better design and construction features will quickly offset the difference in first cost between the cheapest boiler they can buy and the best the market affords.

So if your steam requirements call for boilers in the capacity range from 10,000 to 60,000 lb of steam per hr, we submit the acompanying representative list of large companies that have purchased VU-10 Boilers as a sound reason for confidence that your decision to buy a VU-10 will prove to be a highly profitable one—not only for the first few years of service but throughout the lifetime of the installation.8-43

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Joseph Schlitz Brewing Co. Sharpe & Dohme, Inc. Sunshine Biscuits, Inc.

Representative large companies that have purchased VU-10 BOILERS

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Except Against Short-Circuits
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A fuse link combined with a thermal cutout — the result, a fuse with tremendous time-lag and much less electrical resistance.

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Mail the coupon now for complete information about the All-Purpose Protection of FUSETRON Dual-Element FUSES.

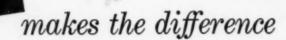
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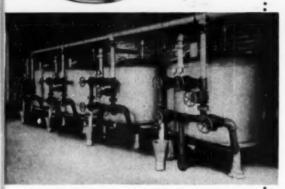
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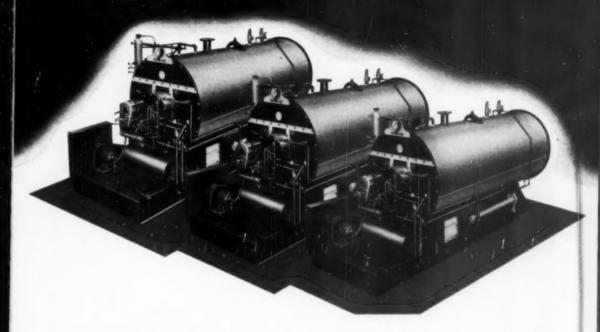
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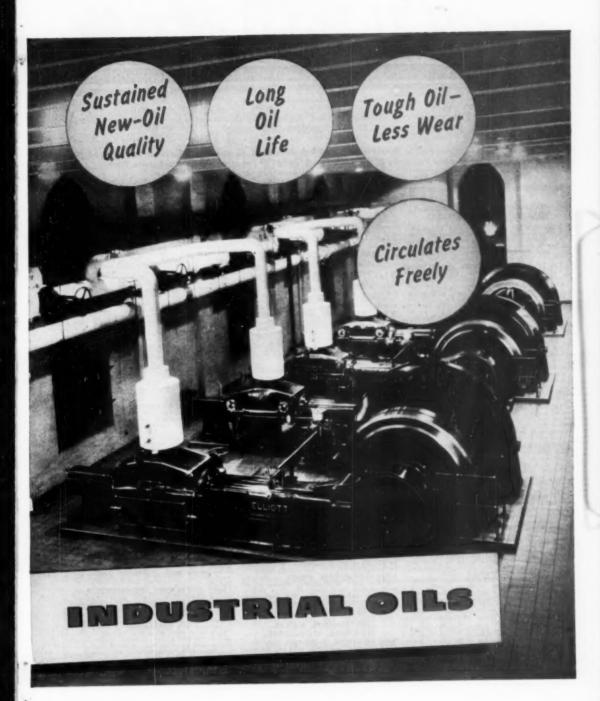
Oxidation attacks oil wherever there is continuous recirculation—in enclosed crankcase systems and, especially, in central circulating systems. It forms damaging acidic compounds, gum, carbon, and sludge. Result: frictional drag is increased, oil lines may become restricted or closed, wear accelerated, efficiency and life lowered.

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SINCLAIR



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# Plate glass polishing for Ford demands polished motor performance

Polishing the clear, safe-vision glass that is turned out in the Ford Motor Company glass plant at Dearborn, Michigan, is a big job. Huge lines of these 60 grinding and 100 polishing machines, which are so delicately aligned that they compensate for the curvature of the earth, are in daily 24-hour operation. This calls for polished performance . . . perfect, dependable service . . . on the part of the motors that power the tireless machines. It is significant that a battery of Wagner 40-hp type CP totally-

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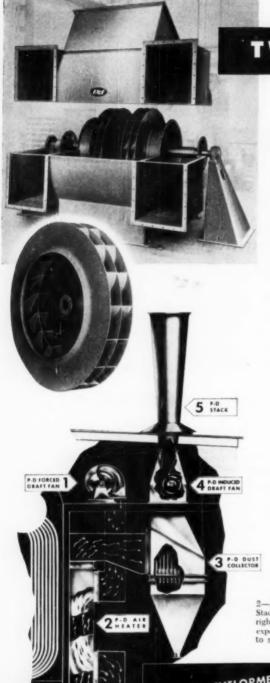




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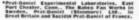
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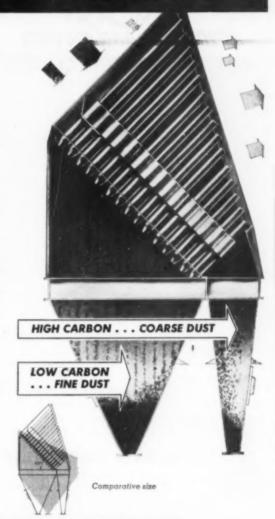
The well-known law, based on the inertia of a mass traveling at high velocities, suggested the design of an apparatus for separating large particles of high carbon content from flyash, for re-injection.

This is accomplished in a single unit by the P-D process of Decantation.\* As the word implies, this collector literally pours off the larger particles into a hopper for re-firing, permitting the finer particles to enter the P-D tubes for precipitation and disposal, as shown in the illustration. Tests have proven that up to 40% of flyash from spreader stokers is generally suitable for re-injection. To obtain the best results from re-injection, and prevent the non-combustible particles from overloading, causing erosion and poor combustion, it is desirable that these particles be removed from the system.

Cut at lower right shows the space this P-D Decantation Collector requires in comparison with a standard unit. The Decantation unit actually occupies less area, (slightly more height), requires no more draft than is

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# Boiler room modernization includes

# — HAGAN controls and meters → at WAYNE WORKS

Wayne Works, Richmond, Indiana, is an important manufacturer of school bus bodies and other motor coach bodies of special types.

Steam use in this plant is primarily for the heating of approximately 463,000 square feet of floor space in the various buildings, although a certain amount of process steam is required. Total demand ranges from a minimum of 10,000 lb./hr. to a maximum of 60,000 lb./hr.

To meet increased demand, and also to provide greater economy in steam production, the company has started modernization of the boiler plant. The first step in this modernization was the installation of a 100 psi, 30,000 lb./hr. chain-grate fired boiler, equipped with Hagan Automatic Combustion Control and Hagan Ring Balance Boiler Meter.

The meter is of the two-pen type, providing a chart record of steam flow and air flow. Steam flow is also shown on a strip indicator.

Since the older boilers which are still in service are manually operated, the advantages of the trouble-free, fully automatic operation of the Hagan system are keenly appreciated by the boiler operators.

For full information on Hagan Controls and Hagan Ring Balance Meters, write to Hagan Corporation, Hagan Building, Pittsburgh 30, Pa.



# HAGAN CORPORATION

BOILER COMBUSTION CONTROL SYSTEMS
RING BALANCE FLOW AND PRESSURE INSTRUMENTS
METALLURGICAL FURNACE CONTROL SYSTEMS
THRUSTORQ FORCE MEASURING DEVICES



Bus Bodies like these represent the greater part of Wayne Works production, but special bodies of many types are also manufactured.

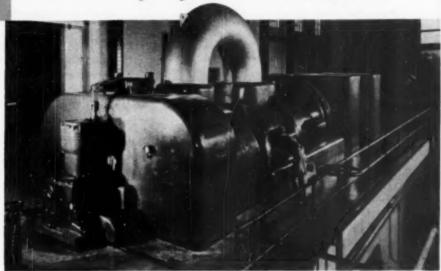


Hagan Control Panel with Hagan Ring Balance Boiler Meter. Panel is located between new and old sections of boiler toom.



View of boiler, taken from in front of control panel. Installation was made by Oberle-Jordre Co., of Richmond. Widlam H. Junker of Wm. W. Carleton and Associates, Cincinnati, was consulting engineer. W. H. Treffinger, Plant Engineer of Wayne Works, was in charge of the project.

ways to insure a clean lubricating system for your new turbine . . .



# FLUSH with Gulf Turbine Flushing Oil FILL with Gulfcrest, the world's finest turbine oil

By taking these two steps, you can insure top lubricating efficiency down through the years for your new steam turbine.

The use of Gulf Turbine Flushing Oil—before the initial fill of lubricating oil—will remove grease-type slushing compounds and carry away harmful abrasives which might be in the circulating system. And, it protects all oil-bathed surfaces against rust. Because Gulf Turbine Flushing Oil is itself a satisfactory lubricant, the undrained portion does not impair the lubricating value of the turbine oil.

Then, to keep the new system clean, fill with Gulfcrest Oil. Because of its outstanding resistance to oxidation, Gulfcrest maintains an exceptionally low neutralization number, and lasts indefinitely. With this quality oil and good operating practice, you can be sure there will be no sludge deposits in cooler tubes, bearing pedestals, or oil lines to worry about.

To get these benefits for <u>your</u> new turbines, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office.

# **Gulf Oil Corporation · Gulf Refining Company**

GULF BUILDING, PITTSBURGH, PA.
Sales Offices - Warehouses

Located in principal cities and towns throughout Gulf's marketing territory



Headquarters for . .

Boiler Feed Water Control . . . Excess or Constant Pressure Control, Steam or Water ... Liquid Level Control ... Balanced Valves ... Desuperheaters . . . Boiler Steam Temperature Control . . . Hi-Low Water Alarms.

# Boiler Feed Water Control . .

Fully-automatic continuous COPES feed means safe. economical boiler operation. Choose from three basic control systems:

- SIMPLE LEVEL CONTROL -one control influence
- FLOWMATIC CONTROL -two control influences
- BALANCED FLOW CONTROL -three control influences

# SIMPLE LEVEL CONTROL



Feeds in response to drum water level changes. For moderate pressures and ratings. Type BI (Leaflet P-1-D) is standard. Type OT (Leaflet P-2-A) is the adaptation for small boilers.

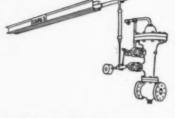
### PUMP GOVERNORS

For excess pressure service in boiler feeding. Special types for motor, or turbine-

drives, centrifugal or reciprocating pumps. Master control available, where needed. Each unit designed for accuracy over a long service life under adverse conditions. Easily maintained. Write for data, outlining your needs.

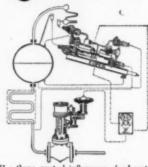


COPES FLOWMATIC



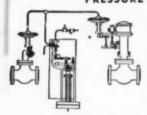
Simplest, most widely used flow-level type feed water regulator; more than 3400 boilers equipped. Feeds according to steam flow and water level to control level closely on fast-steaming generators, on any boilers taking rapid load swings. Easily adjusted and maintained by boiler room personnel. Direct-operated Type D-O, see Bulletin 429-B. Relay-operated Type R-O and airoperated Type A-O, see Bulletin 441.

# BALANCED FLOW



Has three control influences-feed water flow, steam flow and water level. Ideal for the ultra-modern high duty steam generators. Independent of other boiler instruments and controls; will remain on fullautomatic when they are out of service for routine servicing. Can control through hy-draulic couplings. Leaflet P-25,

### PRESSURE REDUCING VALVES



Built for jobs too tough for ordinary stock valves. Each is individually designed for your specific needs, with accuracy and dependability quaranteed. Quiet in operation. Direct or relay operation with master control if desired. Pressure drops up to 2500 psi. Sizes to 14-inch. Bulletin 477.



# DESUPERHEATERS

As accurate on light flows as on maximum loads. Complete atomization of cooling water over full range of operation, because flow is controlled at point of dispersion, not by any outside valve. Easy maintenance. Complete unit self contained. Bulletin 405-B.



### BALANCED VALVES

Practically frictionless. closely balanced. Ports designed for individual installation. Ideal for solenoid or float operation. Leaflet P-3-B.



### BOILER STEAM TEMPERATURE CONTROL

Holds uniform steam temperature under all load conditions. Sprays water into steam through variable-orifice nozzle between superheater stages, according to outlet steam temperature and rate of flow. Designs for boilers with heat exchangers. Write for data, outlining your conditions.

### LIQUID LEVEL CONTROLS

Foropenorclosed vessels. Improved float chambers or flange-type floats, with mechanical or fluid connection to COPES balanced valves. Pressures to 400 paig. Write for details.



NORTHERN EQUIPMENT CO. . 1301 GROVE DRIVE ERIE

Representatives Everywhere BRANCH PLANTS

CANADA

ENGLAND . FRANCE AUSTRIA



Grinding welds on rockets may not be your particular problem but if you BLEND WELDS...REMOVE RUST AND SCALE ... or have PORTABLE CUT-OFF problems, Bayflex Disc-Wheels are the answer. They are fast, safe, economical, easy on the operator (cushioned grinding action). The side as well as edge is used. They fit all standard right angle portable arinders and sanders.

ORDER TODAY FOR A TRIAL.

Sizes available for immediate shipment:

The problem of grinding welds on rockets was solved by these resilient abrasive disc-wheels.

7" x 1/4" x 7/4" 9" x 3/4" x 7/4" 7" x 3/4" 2 7" x 3/4" 9" x 3/4" x 7/4" x 7/4" 9" x 3/4" x 7/4" y 3/4" x 7/4" x 7/4" y 3/4" x 7/4" x 7/4" x 7/4" y 3/4" x 7/4" x 7/4" x 7/4" y 3/4" x 7/4" x 7/4"

Specify Silicon Carbide abrasive for rust and scale removel. Stocked only in 16 grit, 9"x 16"x 36" size.

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Top Performance Consistently Duplicated

# Automatic

now available with

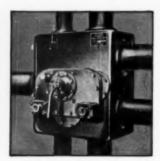
# COCHRANE

# SOFTENER with the HYDROMATIC SINGLE CONTROL VALVE

A UTOMATIC water softening is now easily accomplished with the modern Cochrane Zeolite Softener equipped with the automatically controlled Hydromatic Valve. This remarkable valve combines, in a single pilot-actuated valve, the functions of six individual gate valves common to the customary "valve nest". For auto-

matic control the valve is motorized and electrical controls, as shown on the opposite page, go into action. With a meter set to the degree of hardness of the water, regeneration

is accomplished automatically and economically, with no



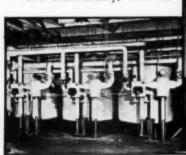
further attention on the part of the operator.

# WIDE RANGE OF ZEOLITES AVAILABLE

The Cochrane Automatic Zeolite Softener is adapted to any set of water conditions with zeolite material best suited to the raw water to be softened. Siliceous and Non-Siliceous Zeolites are

available. The Siliceous include the low and high capacity greensands and the synthetic gels. The Non-Siliceous include the coal-base type and resins of the phenolic and styrene types.

> Cochrane service includes analysis and recommendation.



3-UNIT AUTOMATIC ZEOLITE SOFTENER

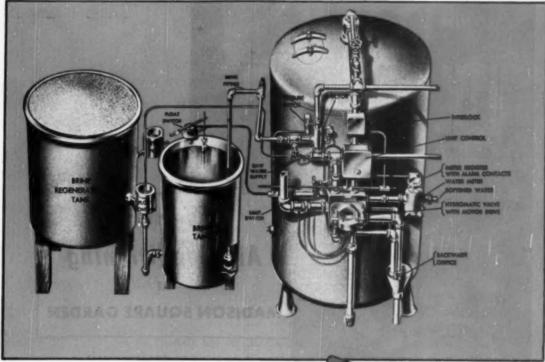


SINGLE UNIT AUTOMATIC ZEOLITE SOFTENER



2-UNIT AUTOMATIC ZEOLITE SOFTENER

# ter Softening



A new publication describing the zeolite process of water softening with detailed information and tables is just off the press. The coupon herewith will bring you a copy.



# **COCHRANE CORPORATION**

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Cochrane Corporation

3110 N. 17th St., Philadelphia 32, Pa.

Please send a copy of your Publication No. 4250 on Cochrane Zeolite Softeners.

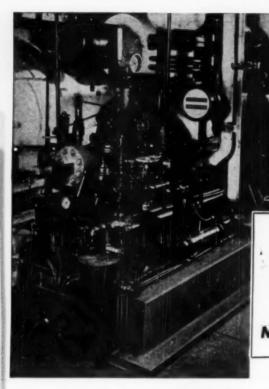
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SOUTHERN POWER & INDUSTRY for DECEMBER, 1950

# The TERRY TURBINE



Air Conditioning

AT

MADISON SQUARE GARDEN

In 1925 Madison Square Garden installed three Terry Multi-Stage Turbines to drive air conditioning and refrigeration compressors. These units deliver 290 hp at 3500 rpm with steam conditions of 100 psi exhausting to a 26 in. vacuum.

After 22 years experience Madison Square Garden installed three more Terry Multi-Stage Turbines, one of which is shown above. This unit delivers 330 hp, at 5650 rpm, with steam at 100 psi exhausting to a 25 in. vacuum.

The same engineering talent and manufacturing facilities that produced these turbines are available to assist you in obtaining efficient power generation.

Any of our District Representatives will be pleased to give you full information on a turbine drive for your requirements. No obligation. May we send you descriptive bulletin?

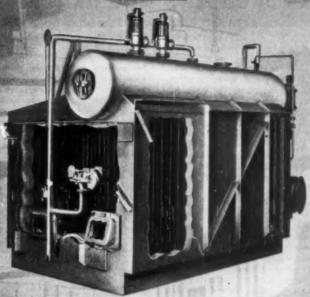


THE TERRY STEAM
TURBINE COMPANY



"Package" with a "Pedigree"

Foster Wheeler-first in the design and fabrication of Water-tube Package Steam Generators



# Units up to 30,000 lb per hr for both small and medium size plants

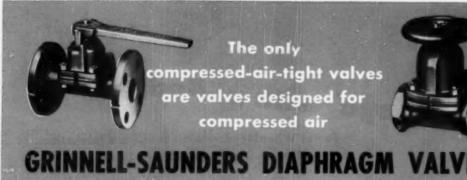
Poster Wheeler was building portable Water-tube Package Steam Generators as far back as 1940. Today, mounting orders from leading industries throughout the country testify to the fact that Foster Wheeler Package Steam Generators are "doing the job." These versatile units, which assure higher efficiency and real economy in the cost of steam production, reflect the broad background of Foster Wheeler industrial and central station experience. They are easily installed by means of a few service connections and are adaptable to various fuel and firing arrangements.

Let us show you how to modernize your plant the Foster Wheeler way at relatively low cost. For further information, write...

FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, N. Y.

FOSTER W WHEELER



Invented by a mine engineer to stop air leaks. A rubber diaphragm seating on metal gives positive closure, even when scale is lodged on the weir. At the same time, working parts are isolated from the air lines so that no packing glands are needed, no stem leaks are possible. That was the idea behind the Grinnell-Saunders Diaphragm Valve. As one engineer said, "When about a third of your air compressors are just pumping air out through leaks and this diaphragm valve eliminates the leaks, cutting out one-third of your air costs, why you've really got something."



Diaphragm gives leak-tight closure against grit, scale, solid matter. The resilient diaphragm, plus the large area of contact, gives leak-tight closure against pressure or vacuum. You can't

keep scale out of compressed air lines but tests prove that Grinnell-Saunders Diaphragm Valves give perfect closure when scale up to 1/6" diameter is trapped in 1" valves and up to 1/4" solids in larger valves.

No "freezing", no clogging, because all working parts are sealed off from compressed air and moisture.

Friction loss reduced by streamlined flow in both directions. Diaphragm lifts high to give unobstructed passage. Friction coefficient remains practically constant throughout range of valve sizes.



Inexpensive maintenance without removing valve from line. Diaphragm is only part that normally wears and needs replacement. Often lasts for

years since compressor and finger plate support it in all positions. Quickly, easily replaced without removing valve from line. No refacing, no disc holder, no packing glands.



Self-financing through compressed air savings. This table from "Compressed Air Data Book" shows how fast you can pay for Grinnell-Saunders Diaphragm Valves out of the compressed air savings, and, perhaps, avoid the purchase of larger compressors.

Size of apening inches	Cu. ft. wested per month at 100 lbs. pressure based on nextle co-efficient of .65	Cost of waste per month based on 6 cents per 1000 cu. ft.
3/8	6,671,890	\$400.31
1/4	2,920,840	175.25
1/8	740,210	44.41
1/16	182,272	10.94
1/32	45,508	2.73

Diaphragms, body and lining material to meet all conditions. Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum (other

materials on special order). Linings of lead, glass, natural rubber or neoprene. Diaphragm materials, natural rubber or synthetics. Write for the Grinnell-Saunders Diaphragm Valve Catalog.





# GRINNELL

Grinnell Company, Inc., Providence 1, R.I. Warehouses: Atlanta \*Buffalo \*Charlotte \*Chicago \*Cleveland \*Cranston \*Fresno \*Kansas City \*Houston \*Long Beach
tos Angeles \* Milwaukee \* Minneapolis \* New York \* Oakland \* Philadelphia \* Pocatello \* Sacramento \* St. Louis \* St. Paul \* San Francisco \* Seattle \* Spokene

Whatever you seek on that next welded piping job...speed...economy ...piping for extreme conditions...piping to withstand corrosion...you will find the answer to it in piping welded the WeldELL way.

You will find the answer because the WeldELL line incorporates job-speeding, cost-cutting features that are combined in no other welding fitting.
You will find the answer because the

WeldELL line expresses the best of all we have learned in fifty years of intensive specialization in forged fittings for

designed piping and pressure vessels.

The WeldELL line also goes beyond all others in range of sizes, types, thick-nesses and scope of materials. Form a good habit—the WeldELL habit. Your reward will be the deep-down satisfaction of using the best there is! Coupon brings catalog.



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TAYLOR FORGE & PIPE WORKS, P.O. Box 485, Chicago 90, Ill. Offices in all principal cities.

Eastern Plant: Carnegie, Pa. . Western Plant: Fontana, Calif.

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Send Bulletin 493 covering Taylor	Spiral Pipe and related fittings,

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# Announcing the new

# REPUBLIC Electronic

See It! Operate It!

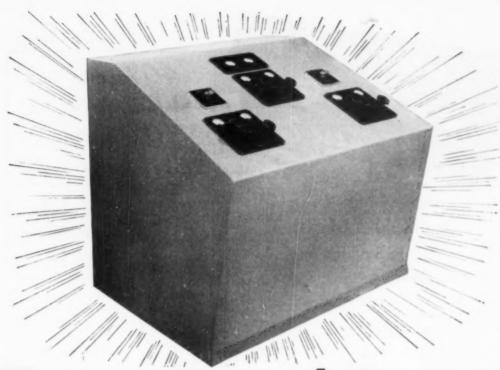
VISIT BOOTH NO. 6

NEW YORK

POWER EXPOSITION

NOVEMBER 27 — DECEMBER 2

You are cordially invited to visit Booth No. 6 to see—to operate—to inspect the new Electronic TELEMASTER Control which will be on view for the first time. Our engineers will be available to explain its many unusual features. The complete line of Republic instruments and controls will also be included in the exhibit.



# Master Control System

"TELEMASTER"

The new Republic Electronic TELE-MASTER Control represents a major advance in the field of automatic control. The TELEMASTER will remotely reproduce, instantly and accurately, a position or a force—perform arithmetical and algebraic calculations—and can be used for multiple operations. Essentially it performs the function of a mechanical link through electrical and electronic means. It is applicable to all types of combustion and process control.

In plants where distances between operating units are great, the lags inherent in the compression effect of a pneumatic master system are appreciable. This effect is frequently sufficient to prevent realization of the full benefits of automatic control. The Republic Electronic TELE-MASTER Control has no inherent lag, regardless of distance. This means that centralization of operations can be achieved without any sacrifice of control performance. Full details sent upon request.

REPUBLIC FLOW METERS CO. • 2240 DIVERSEY PARKWAY · CHICAGO 47, ILLINOIS

# Could You Use SAVINGS Like These?

40% less
Fuel Consumption
50% more
Boiler Capacity

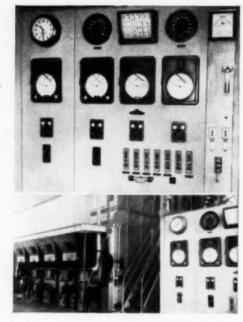
# Bailey Meters and Controls Insure Savings at Kerr Bleaching & Finishing Works, Concord, N. C.

The key to complete returns on any investment in new power equipment is a fully co-ordinated system of meters and controls. It's the old story, the tail that wags the dog—careful attention to this comparatively minor part of the over-all installation cost can mean the difference between profit and loss in operation.

Here's where Kerr Bleaching & Finishing Works has cut operating costs—by installing co-ordinated Bailey Meters and Controls. The installation includes Bailey Meter Combustion Control, and Bailey Two-element Feed Water Control.

Such a co-ordinated system is an important plus for Bailey customers. Nowhere else can you buy such a complete range of equipment, selected without bias to do the best job for you. Nowhere else can you find such expert engineering service, immediately available through conveniently located direct sales and service representation. May we help you?

Call our local branch office or write for Bulletin
15-H.



Control panel, showing completely co-ordinated Bailey Meters and Controls at Kerr Bleaching and Finishing Works, Concord, N. C.



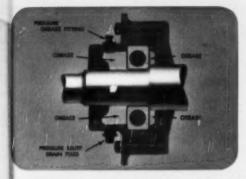
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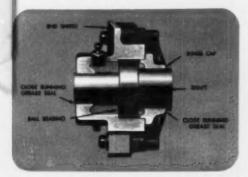




 EXTRA BEARING PROTECTION — Tri-Clad gives you extra bearing protection because heaviest standard-service bearings are carefully selected to withstand severe loads for long periods.



EXTRA GREASE — four times the ordinary amount of grease is packed into the large Tri-Clad grease reservoir. Since bearing life depends on grease, this means that Tri-Clad motors will run safely for years — for as long as any general-purpose motor you can buy.



SEALED-IN BEARINGS — Bearings and grease are completely sealed in a cost housing with long running seals for extra protection from dirt, dust, and lubricant leakage.

TRI CLAD MOTORS will run safely without relubrication for as long as any general-purpose motor you can buy—

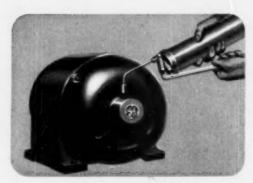
Tri-Clad extra lubrication "protection" can save you money because:

- Tri-Clad's oversize grease reservoir and the heaviest standard-service bearings mean you do not have to bother with greasing between motor check-ups.
- 2. When relubrication is needed on those tough applications, you can grease a Tri-Clad without interrupting production-line operations.

Tri-Clads are grease-gun easy to lubricate on the job. Moreover, a Tri-Clad motor will run safely where an ordinary motor would fail. Chances are you'll be spared the cost of a "special" motor.

YOU BE THE JUDGE! The best way to prove to yourself that Tri-Clad gives you the most for your motor dollar is to contact your local G-E office. Tri-Clad stocks are complete. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.





PRESSURE-RELIEF GREASING — An efficient system of pressurerelief lubrication (with standard fittings) enables a Tri-Clad motor to be quickly and easily greated on the job when and if it's needed. dependable Heat that is economical-efficient-easy to use

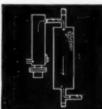
# CHROMALOX ELECTRIC Circulation Heaters

for heating liquids
preheating fuel oils
heating compressed air
and other gases

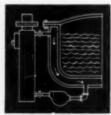
Production costs go down . . . operating efficiency goes up when you install economical CHROMALOX Circulation Heaters. They give you measured quantities of heat, at temperatures up to 750° F. that can be rapidly reached and accurately controlled. Dependable, around-the-clock operation, minimum maintenance.

Uses include: Water heating applications such as steam boilers and accumulators; jacketed chemical kettles, tanks and processing equipment. Preheating fuel oils; heating Dowtherm, Aroclor, Prestone or heat transfer oils. Heating nitrogen, air and other gases, drying steam, plastic powders and other process work.

HERE ARE TWO TYPICAL APPLICATIONS



Heating Nilrogen to Reactivate Alumina



Heating Oil-Jacksted Kettle

CHROMALOX

Electric Heat for Modern Industry

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advantages of
CHROMALOX
Electric Heaters

- 1. Efficient heat when and where you need it.
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- Wide selection to mee: your specific heat requirements.
- Improved process, production and product with fewer rejects.

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It has complete data on many of the 15,000 Chromalox Electric Hesters and Equipment used in modern industry.



EDWIN L. WIEGAND COMPANY 75a3 Thomas Soulavard Pittsburgh 8, Pa. Please sond Catalog 50

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unting Precision Bronze Bars are of SAE 660 Bronze, preferred by experienced design, production and maintenance engineers as the finest all-purpose bearing bronze.

The metallurgical structure of Bunting Bars is the responsibility of a competent metallurgical staff supervising foundry control and constantly checking chemical and structural correctness.

Bunting Precision Bronze Bars are carried in stock by hundreds of Bunting Stock-Carrying Distributors. There is a Bunting Distributor in your vicinity, ready and qualified to serve you. The Bunting Brass and Bronze Company, Toledo 9, Ohio.

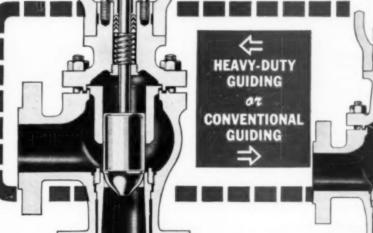


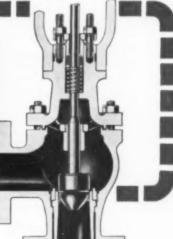


## LIQUID LEVEL CONTROLLERS

#### Features:

- · Angle body construction with renewable chrome nickel stainless steel seat ring. Directs flow directly into outlet piping. Protects body from contact with high velocity floshing fluids—preventing body washout difficulties.
- · Easily dismantled for replacing worn
- · Available with heavy duty or conventional positive alignment inner valve guiding.
- Iron or steel flonged angle body construction in sizes 1", 2", 3", 4" and 6".
- · Operated by suitable super-structure to evercome pressure unbelence conditions.
- e Furnished with Fisher Toffen V-Ring Packing. Requires no lubrication.





**Fisher Governor Company** MARSHALLTOWN, IOWA

# Like this record of low-cost maintenance?

make it yours with dependable quality

## CRANE VALVES

CRANE No. 960 Crane Brass Pressure Regulator for steam or nic.

Literature on request through your Crane Branch or Crane Wholespler.

A CASE HISTORY FROM CRANE FILES

PROBLEM: To choose a pressure regulator that would assure a steady, unvarying steam supply to cooking kettle for an exacting brewing process.

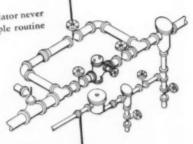
WORKING CONDITIONS: Regulator subject to continuous operation 24 hours per day. Main steam supply at 100 psi to be constantly reduced and

SOLUTION: Crane No. 960 Brass Pressure Regulator. (Former model with

RESULT: For 16 years, throughout its lifetime, the Crane 960 Regulator never failed, never faltered, never required more than prescribed simple routine

Replaced with new Model 960 Crane Pressure Regulator. servicing. With all wearing parts renewable, it will virtually never wear out. Now in service 18 months; operating cost: zero.

A typical example of the long life and low-cost maintenance that make Crane Quality the best value in all types of valves. That's why... More CRANE VALVES are used than any other make



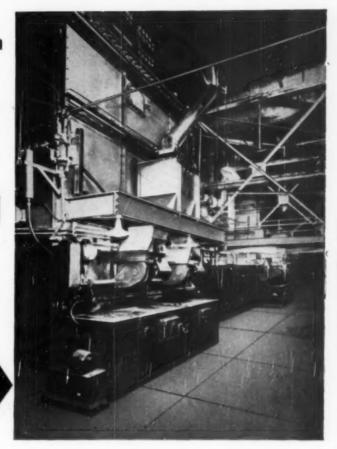
# CRANE

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas

FITTINGS . PIPE PLUMBING It's even coal distribution that gives peak combustion efficiency

# PERFECT SPREAD **STOKERS GIVE YOU BOTH**

Two AE Perfect Spread Stokers recently installed by Marion Power Shovel Company. The boilers, each of 38,000 lbs. per capacity, are Wickes two-drum bent-tube type. Consulting Engineer, Frederick L. Smith. Send coupon for the complete story of this power plant.



SERVICE RECORDS prove that spreader stokers save money wherever installed. They burn almost any coal with remarkable efficiency, including the high moisture, high ash types.

And the AE Perfect Spread Stoker is the best investment you can make in a spreader. Its feeder assures continuous, accurate coal feed, even when coal is wet. Its spiral overthrow rotor is unique and absolutely superior in distributing coal evenly

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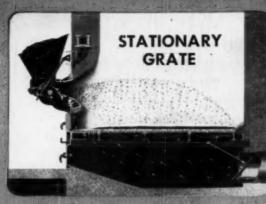
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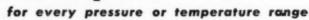
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## **Timely Comments**

#### Plastics Industry -Faces Problems

TWO PROBLEMS of major significance face the plastics industry during the coming months, according to **5. L. Brous**, marketing manager of

General Electric's Chemical Department, which manufactures and molds plastics compounds.

1. Shortages of materials and manpower

2. Misapplication and poor workmanship

Mr. Brous believes that the latter is by far the more important to any long range growth and prosperity.

At the onset of the current rush for goods, Mr. Brous explained, the plastics industry had overcome to a great extent, the adverse reaction at consumer level to plastics materials for functional services which had resulted from all too frequent use and reference to plastics as "substitutes."

Now, late 1950 finds fundamental industry conditions prevailing which are similar to those of the mid-40's.

Perhaps neither the materials manufacturers nor the processors can fully control the supply and disposition of plastics materials. Certainly, Mr. Brous concluded, both groups can exert influence over the end uses to which available materials may be directed. The industry must resist impulses and pressures which will result in lowered quality of its products.

#### Application Data

In the November issue of SP&I ("The Case for Plastics in Industry"), Carl Eckenrod, plastics division superintendent of the Wright Manufacturing Company of Houston, Texas, showed how plastics have successfully served several Southwestern industrial plants. Greater safety, better insulation, longer wear, reduced weight, corrosion resistance, etc., have been attained, often at a lower cost per unit, by the intelligent use of plastic materials.

Southern manufacturers will soon be planning on using increasing quantities of plastic parts for to-day's market. As Mr. Eckenrod stressed in his SP&I discussion, "A need must be identified by someone familiar with the functional requirements of a given part. This will invariably originate within the industry using the part, not from an outside source."

Requirements of the part must then be clearly conveyed to the plastic engineer or designer to enable him to recommend the material, design and method of fabrication. In many cases, these recommendations can be field-tested by use of sample parts, fabricated from stock materials or a sample mold, before any large investment is made in permanent molds or other production methods.

Plastics have a place in many industries. That place must be determined by the cooperative effort of people in each industry, who know what they want, and the people in the plastics field who know how to make what they want.

It requires an objective attitude, an open exchange of facts and considerable resourcefulness on the part of both manufacturers and merchandisers in order to determine, in each instance, whether plastics can be of service.

#### Don't Give Up On That Old Plant

ALTHOUGH 75 per cent of the nation's industrial plants are more than 25 years old, industry can increase productivity enough to meet the growing military needs as well as»

satisfy civilian consumer demands without building new plants.

No old plant is absolutely hopeless. It's not the age of the building but the technological methods employed that really determine the modernity of any plant. It is not the brick and mortar shell that governs the unit cost of its products—it's how we fabricate them, how we handle them.

Materials handling of all sorts is the "soft underbelly" of production, the sphere of greatest vulnerability in cost and efficiency, the weakest link in the production process.

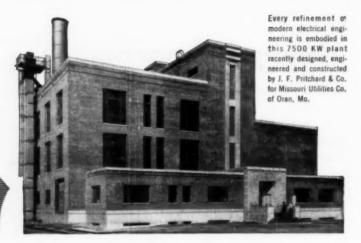
At the October fifth annual meeting and exposition of the Society of Industrial Packaging and Materials Handling Engineers, Leo J. Pantas, head of The Yale & Towne Manufacturing Company's Salem Division, summarized some forty improved materials handling methods through which productivity may be increased in old plants.

He emphasized that while old plants at first glance seem to exclude efficient manufacturing, a combination of engineering ingenuity abetted by some modern mechanized materials handling equipment and techniques, can often make a more efficient operating unit of even the oldest plant.

Most old-plant problems include peculiarities and shortcomings in physical structure and production layout. Therefore, it is not the chronological age of a plant which signifies its age, but rather the extent to which these and other disadvantages exist. Even a newly built plant is really an "old plant" if it has these characteristic disadvantages.

Materials handling is a prime tool by which we can harvest the fullest capacities of existing industrial plants.





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# Industry Speaks

S.A.S.I. Award Presented to

#### THOMAS W. MARTIN

Chairman, Southern Research Institute

Remarks of Mr. Martin at the SOUTHERN ASSOCIA-TION OF SCIENCE AND INDUSTRY Science-Industry Conference held at Atlanta, Georgia, October 18, 1950 on the occasion of the Distinguished Service Award for contributors to technological progress in the South.

R. Martin expressed appreciation for the award and at the same time pointed out that both scientists and business men had more significant parts in Southern technological progress than he has had. He mentioned especially Dr. Stewart J. Lloyd who has been so active in S.A.S.I. for many years, Dr. George Palmer, Dr. Paul W. Chapman, Mr. Homer M. Pace, Dr. Emmett Reid, and the late Robert Strickland of Atlanta who died a few years ago and was succeeded by Mr. John A. Sibley at the Trust Company of Georgia.

He also pointed out that the trustees of the Southern Research Institue, the 200 members of its Advisory Council, the many contributors to capital funds, and the group of scientists on its staff—all have made great contributions.

The speaker pointed out that Dr. Lloyd and a group of business men initiated in 1930 the Southern Research Institute as it now exists. In 1940 it was again presented several times to business groups by Dr. George Palmer of the University of Alabama, following which the Institute was organized as a non-profit corporation with Mr. Benjamin Russell as Chairman. Mr. Russell died soon afterwards and Mr. Martin succeeded him as chairman.

The Institute has now been operating six years and has increased its capital funds to about two million dollars and has a larger volume of research than at any time in its history. "It is apparent", said Mr. Martin, "that it stands at the threshold of still greater usefulness. It symbolizes a new approach to the economic problems of the South. And the furtherance of its program offers opportunities for investment in the economic welfare of the southern region carrying a return far greater than we envisioned at its organization".

He also pointed out that there has been rapid progress in the region in recent times, especially during the past decade when the South percentagewise outgained the nation on all economic fronts.



Thomas W. Martin

"These advances are but the early steps of things to come—welcome signs of what can be brought to pass if we apply ourselves to the task of developing the resources and manpower of the area. Production can be still further increased if the worker can have at his disposal scientific knowledge and technology, and if business leadership creates new industry that uses a high component of science and human skill. The result is more jobs, better jobs which make for educational and cultural progress, which in turn, accelerates new economic growth. Thus, we may see a vision of a New South free from the poverty which through generations has afflicted so large a percentage of its people.

"Those who have contributed so much toward building the South to its present status are in a great measure the men who hold its future in their hands. Just as Southern business and industry must depend for future greatness upon applied research, so must research itself look to business and industry for its breath of life—a solid financial foundation.

"In conclusion: If the South is to continue to meet the challenge of science, her supreme need is for the development of leaders with enthusiasm and determination to develop the Southern region; and also, men of scientific understanding, highly endowed and highly trained in the sciences and their application to Southern problems. Trained and inspired leadership is developing to make the most of our resources, and the Southern Association of Science and Industry is doing an effective work in this respect."



JUICE INDUSTRIES DIVISION, CLINTON FOODS INC., DUNEDIN, FLORIDA.

## —Power Generation in the Frozen

Power generation from process steam improves over-all economy in this large Florida frozen citrus concentrate plant.

THE production of frozen orange, grapefruit, and other citrus juice concentrates is one of

the modern miracles of American ingenuity and enterprise. The industry has reached a present day share of the citrus fruit grown in Florida. The industry's biggest growth, as

position of processing a major

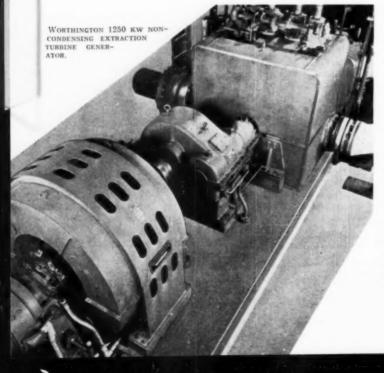
The industry's biggest growth, as reported in TIME of October 16, 1950, "came from the sensational success of frozen orange juice, which also bailed out many a floundering citrus grower. Four years ago, Florida had such a glut of oranges that prices tumbled to as little as 65c a box. In 1949-50, as frozen food packers put up 21 million gallons of concentrated orange juice, the demand for oranges outran supply and prices rose to \$3.50 a box."

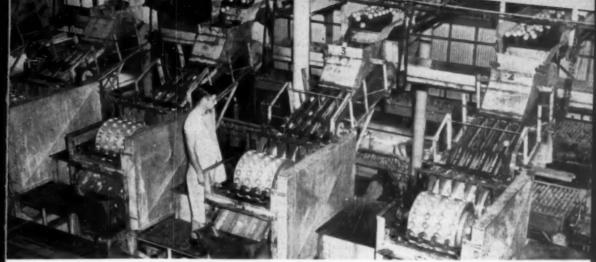
This article describes the utilization of process steam to produce by-product electricity in the huge plant of The Juice Industries Division, Clinton Foods Inc. at Dunedin, Florida, the first producer to market a commercial citrus concentrate pack.

#### **Processing Data**

Bulk fruit is brought into the plant in large trucks of approximately 40,000 lb capacity. Forty thousand pounds of fruit is equivalent to about 445 boxes or one carload. The Juice Industries' Dunedin, Florida plant uses about 25,000 boxes or 225,000 lb daily.

The fruit is weighed upon arrival and paid for by the pound.





TYPICAL INSTALLATION OF SKINNER ROTARY JUICE PRESSES.

## Citrus Concentrate Industry—

It is then dumped into a stream of water, carried to the plant washing machines, graded, and all decayed fruit removed. After being tested for sugar and acid content, balance of fruit is stored in bins, each bin being identified as to quality of the fruit and number of boxes. Prior to processing, fruit that is a little sour is blended with fruit that is a little sweet, to secure a uniform product with a sugar-acid ratio of not less than  $12^{12}$  to 1 and not more than 17 to 1.

When run from bins to the plant, the fruit is again washed and Growth of the frozen citrus concentrate industry has been sensational — over 25 million gallons will be packed this season.

graded, and portions showing any evidence of decay removed. The latter go to the feed mill where they are processed into cattle feed.

From the grading belt the high quality fruit go to the fruit sizers, and then to the juice presses. The juice is screened to remove any particles of seed or peel. It then goes into vacuum storage tanks where the vacuum not only re-

moves any air which might be in the juice (air would have a tendency to oxidize the ascorbic acid), but also cools the juice to a temperature of about 60 F, to prevent fermentation taking place.

From these storage tanks the juice is fed to the evaporators, where it is evaporated under high vacuum, 29½-in. referred to a 30-in. barometer. At this high

#### - THE AUTHORS -



W. H. Mouquin

#### W. H. Mouquin

Steam Turbine Division Worthington Pump & Machinery Corp. Atlanta, Georgia

#### B. C. Skinner

Vice President, Florida Division Clinton Foods Inc. Dunedin, Florida



B. C. Skinner

vacuum the juice boils at 60 F. so there is no chance of fermentation taking place in the evaporator

Part of the juice, with a little pulp mixed with it, is stored in separate tanks at a temperature of about 40 F. This fresh juice with added pulp is mixed in blending tanks with the concentrated juice as it comes from the evaporator, to secure a uniform Brix of 41.5° or higher. From the blending tanks the concentrated orange juice goes to the filling machines. is canned and taken immediately on high speed conveyors to the freezing tunnel, which is maintained at approximately -30 F. Here it is frozen very quickly. It is cased immediately as it leaves the tunnel, and moves on high speed conveyors to the cold storage rooms, which are held at -5 F. The frozen citrus concentrate is stored fit in cattle feeding, and finds a

in these warehouses until shipped.

Great care is used in handling the juice in the plant. The latter is kept as clean and sterile as possible, because the juice is not pasteurized and the bacteria and mold count must be kept at a very low figure to insure long life and good flavor when it reaches the consumer.

#### Peel Handling

The peel from the juice presses first goes through oil extractors. This extracted oil is used for making flavors for orange ade, etc. The peel then goes to the feed mill, where it is ground in a hammer mill, and then dried to about 8 per cent moisture. This ground and dried peel is then bagged and sold to the dairymen as a cattle feed. It contains minerals and vitamins which are of great bene-

ready market, not only in Florida but in all parts of the Southeast.

#### Quality of Product

The frozen concentrated orange juice is popular with the consumer, because the flavor is usually better than that of average fresh juice. Its uniformity and the processor's advantage of being able to select those fruit which have reached a degree of maturity makes the most satisfactory product. The frozen concentrated orange juice has certain economic advantages over full strength juice: there is a saving of about half in the freight cost, and the cost of tins is about one-third of those for full strength juice. The small space occupied by the concentrated orange juice lends itself readily to low temperature storage, which maintains the flavor over many months.

#### Steam & Power

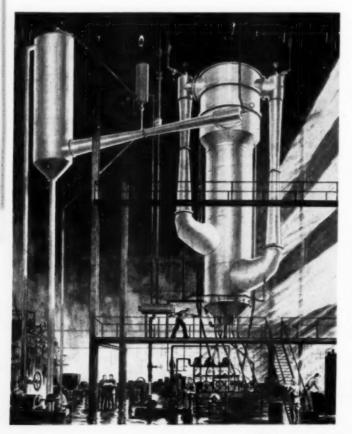
Considerable steam is used in

TYPICAL INSTALLATION OF A SKIN-NER LOW TEMPERATURE EVAPORATOR.

The principle of low temperature boiling, or evaporation, is the underlying feature of this evaputilizes large, enclosed orator. It heating tubes, made of light gauge stainless steel usually about 7-in. in diameter and 20 ft long.

Liquid to be evaporated is fed into the tops of these tubes by means of a distributor which starts the liquid down inside walls of the tubes in a uniform film of approximately 1/16-in, thickness. To bring about low temperature evaporation, two conditions must prevail: (1) the external walls of the tubes must be brought to the required temperature and (2) the pressure on the film of liquid inside the tube must be brought down to an absolute minimum.

In this evaporator, the boiling chamber within the evaporator tubes is maintained at a high vacuum, 29½-in. or one-half inch of mercury absolute pressure. This gives a boiling temperature of



the Juice Industries' plant. This steam was originally generated at 150 lb and about 35,000 lb/hr is used at that pressure. In addition, steam was needed at 45 lb and 5 lb.

As a new boiler was needed, a study was made to determine whether to continue to generate at 150 lb or go to a higher pressure. Thought was given to design pressures of 450 lb or higher; but this was abandoned because local water conditions would necessitate more expensive water treating equipment than was justified. The idea of extracting 150 lb steam was also abandoned for two reasons. First, to get much work from the steam, a high pressure boiler would have been required. This had already been decided on its own merits as unjustifiable and the additional cost of the turbine, to allow extraction at 150 lb, substantiated the decision to remain at lower steam generating pressure. Secondly, it was determined that enough kilowatts could be made

pressure to the 45 lb and 5 lb process steam conditions to satisfy plant demands on a purely economic basis.

The decision was made to purchase a 250 lb boiler and to furnish dry and saturated steam only. Again local water conditions eliminated serious thought of superheated steam.

Discussions were also being carried out with turbine-generator manufacturers. These led to the selection of a 1250 kw geared turbine-generator set of the automatic extraction non-condensing type as the best size and design.

The plant had an existing boiler capacity of 90,000 lb/hr at 150 lb. A new boiler was purchased for 60,000 lb/hr at 250 lb. An interesting design feature of the turbine is that although it is to operate at all times at 250 lb, in

generating from a slightly higher the event of an emergency shutdown of the single higher pressure boiler, the turbine will develop full capacity at the lower pressure. It also functions in a fully automatic fashion on the lower pressure both as to extraction and back pressure control. This was considered a very desirable feature in a highly seasonal industry such as this where fruit worth many thousands of dollars is received each day.

> The 150 lb steam is used to operate air removal jets discharging to atmosphere, removing the air from the evaporators. It is also used for operating jets on the ice water refrigeration system, some of the jets on the evaporators, and the flash sterilizers or Mallory sterilizers used to sterilize the orange juice and orange-ade before it is canned.

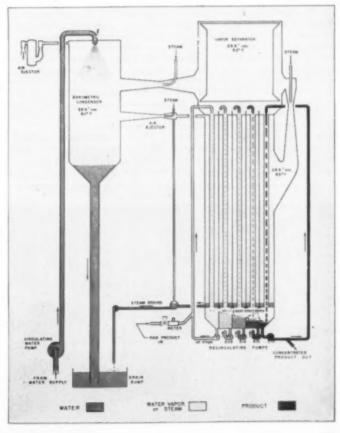
> From 25,000 to 35,000 lb/hr is required at 45 lb. Some of this

OPERATING CYCLE OF SKINNER EVAP-ORATOR USING FIVE STAGES OF CON-CENTRATION IN ONE SHELL.

between 50 and 60 F, which is only a little higher than the temperature in an ordinary electric refrigerator.

As a medium to heat the liquid which is flowing down the evap-orator tubes, the vapor of the boiling product itself is compressed by additional steam through boosters until it reaches approximately 78 to 100 F and it is this vapor which heats the tubes down which the product is flowing.

The total time in which the product is exposed to this low temperature is a matter of only a few minutes. The falling film is so thin that the temperature of the product never exceeds its boiling point. The liquid never reaches a higher temperature than reaches a figure temperature than its boiling point at the vacuum inside the tube. Thin juice will boil at 60 F. The concentrated juice will boil at 68 F, under a vacuum of 29½-in. of mercury.



steam is used for operating jet boosters on the evaporators and part of it is used for operating the steam-heated dryers used in making cattle feed. This pressure was selected as the extraction point on the turbine, and design allowance was made for a maximum demand of 45,000 lb/hr in case of future expansion.

About 20,000 to 25,000 lb/hr of 5 lb steam is required—some for operating booster jets on the evaporators and part going to operate the triple effect evaporator in which citrus molasses is made. This was also a good pressure to use in heating the feedwater and is in part so utilized. This 5 lb was selected as the back pressure on the turbine and the design of the turbine is such as to supply the required amount.

It was necessary that this 5 lb steam under normal conditions be maintained within close limits. This, of course, was possible on the 45 lb extraction pressure due to design of the bleeder control. An exhaust pressure control was placed on the turbine to maintain this 5 lb pressure within allowable limits. This control is in operation at all times when the unit is in parallel with the public utility system.

Under normal conditions the turbine-generator is paralleled electrically with the Florida Power Corporation system with appropriate switchboard devices to prevent feeding current back into the power company lines. In the event of a storm and an unexpected power failure, the turbine is equipped with a solenoid trip device which automatically disconnects the back pressure control. The unit then runs on its own governor and is capable of maintaining essential production and services.

The unit at present is also used to maintain the plant electrical load at unity power factor when paralleled with the public utility. This is a requirement of the power contract.

Basically the unit operates in parallel with the power company. With the controls as designed and in operation, the turbine generates kilowatts only as steam for process is required. The turbine extracts only about 7 per cent of the available heat in the steam. This is all that is chargeable to the turbine. Some additional steam is required where low pressure ejectors were selected over higher pressures. This was determined to be a very small amount and negligible in view of the power generated.

All things considered and based on the initial operating figures the turbine-generator installation will be completely paid for in less than three seasons. This is certainly a very fine return on the money invested.

The study resulting in the installation of this unit caused a very interesting small Worthington turbine-induction set to be purchased and installed at another feed mill owned by Clinton Foods Inc.

This installation at present consists of a feed mill where a constant demand for 5 lb steam exists for maintaining a steady back pressure in the evaporators which remove water from the pulp and peel. It was thought at first that no generation would be practicable, due to consideration of capital expense versus small invested capital in the feed mill.

However, with the approval of the power company, a small induction generator set was considered. It was finally decided a 250 kw induction generator driven by a small geared turbine would exactly balance the steam demand.

This generator also has the attractive feature of requiring no skilled operating personnel, or expensive switchgear. The unit is brought up to about 1 or 2 per cent over synchronous speed by means of the turbine. The operator then merely closes a switch and the machine is under control of the back pressure governor. Thus it can only generate kilowatts, as the evaporator demands 5 lb steam. This installation is very inexpensive and will be paid for in about one season. Capacitors should also be installed to bring power factor up to unity, as these sets have a usually undesirable lagging current characteristic.

With the growth of these plants the installation of centrifugal refrigeration compressors becomes a consideration. These compressors due to their high speed and operating characteristics make excellent use of steam turbines as prime movers. In proper sizes, extraction, mixed pressure, and other more or less unusual designs of turbines are economically possible and desirable.

In this industry, like all others requiring large amounts of process steam, it is almost impossible to excel steam turbines for overall power steam economy.

Another important factor is reliability of performance. Literally hundreds of dollars per minute are at stake. No short design cuts or elimination of safety devices can or are considered in selecting equipment.

PART OF THE WORTHINGTON INSTALLED AMMONIA COMPRESSORS, SOME OF WHICH LOWER TEMPERATURES TO -40 F.





# FIRE PROTECTION for Generating Stations

#### By Adolf H. Mergenthaler

Principal Electrical Design Engineer Southern Services, Inc. Birmingham, Alabama

This article calls the attention of design and operating engineers to the fire hazards which exist in most modern generating stations. It offers modern means of controlling these many hazards and establishes a guide to help put sound protective measures into practice.

THE Underwriters minimum requirement for fire protection of an industrial plant is one extinguisher, containing 2½ gallons of water or other extinguishing agent, to be discharged under pressure, for every 2500 sq ft of floor space. By meeting this requirement it may be possible to keep a fire confined to its starting point until further help arrives or heavier equipment can be brought into action.

However, it must be recognized that in a modern steam generating plant with its high steam temperatures and the possible occurrence of extremely heavy short circuit currents, a large fire can break out almost instantaneously due to equipment, steam pipe, oil pipe or material failures. Such a fire could easily be beyond control of the minimum recommended portable fire extinguishing apparatus.

ratus and heavier supplementary apparatus in the hands of the limited operating personnel on the job. Consideration must also be given to the fact that if such a fire breaks out, the area involved may not be accessible to the personnel due to the possible presence of high temperature steam and gases.

The loss in such a case would not be confined necessarily to the equipment damage only, but might also involve loss of generation on one or more units over a period of weeks.

It has been customary to provide in addition to the light portable fire extinguishers one or more heavy units consisting of two 50 lb CO<sub>2</sub> cylinders mounted on wheels.

The equipment listed above proved entirely inadequate during recent heavy equipment fires, After the contents of all portable equipment had been used up, water had to be applied in order to extinguish the blaze with resulting additional damage to electrical equipment. In each case, it took several hours to get the fire under complete control. The use of large amounts of carbon tetrachloride indoors resulted in several cases of toxic poisoning.

These cases demonstrated that heavy, built-in, remote controlled fire protection apparatus and water hose with fog nozzles are necessary to confine a large, sudden generating station fire to its point of origin and to extinguish such a fire in minimum time.

This fact has been recognized by various insurance groups to the extent that, following a field inspection by insurance personnel, owners are requested to abate existing hazards by structural or process changes, or by the installation of

additional fire protective equipment. However, aside from listing ing such protective equipment in bulletins and setting forth installation standards, no definite guide has been established which will permit designing or operating engineers to plan for comprehensive fire protection of a generating station.

This article first discusses the principal types of fire extinguishing equipment and then proceeds to present specific recommendations for overall fire protective installations in generating stations.

### FIRE EXTINGUISHING EQUIPMENT

Fire extinguishing equipment designed for protection of hazards such as those encountered in generating stations is based on proper use of various fire extinguishing mediums. The advantages and disadvantages of these mediums are as follows:

#### Carbon Dioxide

#### ADVANTAGES

- 1. Non-toxic
- 2. Speed of extinguishment
- Adaptable for automatic operation

- Non-injurious to electrical insulation
- 5. Leaves no residue
- 6. Electrically non-conductive.

#### DISADVANTAGES

- Necessary to fight fire from close quarters if portable equipment is used. (Remote control system recommended)
- Supply limited by the amount of gas which it is practicable to store
- Not too effective on certain fires where large amount of cooling action is required
- 4. Too rapid dispersion under conditions of violent up-draft, particularly outdoors. (Contrary to prevailing opinion, it should be noted that wind alone will assist rather than hinder extinguishing efforts by helping to sweep the gas over the surface, provided it is applied in sufficient quantity from the windward side)

Carbon dioxide fire equipment is available in the form of first aid extinguishers or fixed systems, remotely controlled and piped to the hazard. Carbon dioxide for fixed systems can be stored either at the pressure corresponding to the normal room temperature, or it can be stored at a reduced pressure obtained through the lowering of the gas temperature by means of mechanical refrigeration or cooling water. In the first case, high pressure cylinders, having a capacity of 50 or 100 lb of gas are used. In the second case, low pressure refrigerated tanks are used.

Since the vapor pressure of carbon dioxide gas drops from approximately 850 psi abs at normal room temperature of 70 F to about 300 psi abs when refrigerated to 0 F, mechanical considerations which limit the size of high pressure containers, will permit storage of comparatively large quantities of refrigerated gas, and capacities of 6 to 10 tons in one single refrigerated tank are common. Insofar as extinguishing ability is concerned, no appreciable difference between high pressure and low pressure gas is noticeable.

Since carbon dioxide in heavy concentrations is suffocating, automatically operated carbon dioxide room flooding systems should have a time delayed discharge, preceded by an alarm signal, to give the personnel time to evacuate the affected space.

#### Carbon Tetrachloride

#### ADVANTAGES

- 1. Ability to fight fire from distance of 20 ft to 30 ft away
- Fair amount of cooling and quenching action
- 3. Electrically non-conductive

#### DISADVANTAGES

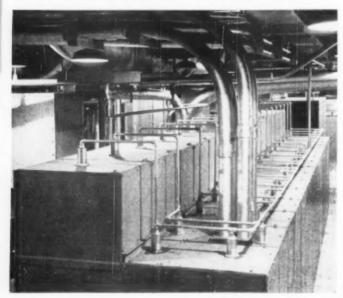
- Highly toxic (should not be used on large fires indoors unless breathing apparatus is provided)
- Corrosion of containers and working parts of extinguishers due to the presence of hydrochloric acid when in contact with moisture
- Is a solvent and not suitable for certain types of insulation

#### Foam

#### ADVANTAGES

- 1. Non-toxic
- 2. Positive and lasting action
- 3. Can be applied 20 ft to 30 ft

PIPING AND NOZZLES FOR CO. FIRE PROTECTION OF 2300 VOLT STATION SERVICE SWITCHGEAR, GADSDEN STEAM PLANT, ALABAMA POWER CO.



away when using portable equipment and up to 50 ft away when used in connection with hose lines

- Blanketing effect when applied in satisfactory quantities
- 5. Considerable cooling action
- 6. Effective for outdoor conditions

#### DISADVANTAGES

- 1. Is conductor of electricity
- Leaves residue which is difficult and expensive to remove
- Portable equipment requires annual re-charging

There are two types of foam: (A) Chemical foam, in which foam is generated by chemical action between different solutions or powders. This type of foam consists of tiny bubbles of CO, gas. (B) Mechanical foams, where foam is generated mechanically by the entrainment of air into a foam liquidwater solution which produces a foam similar to chemical foam, equally effective, except that air takes the place of CO, in the bubbles. This foam flows more freely than chemical foam and is generally easier to generate.

#### Dry Powder

(CO, or Nitrogen Expelled)

#### ADVANTAGES

- 1. Non-toxic
- Quickness of extinguishment (in certain instances faster than CO.)
- Certain amount of residual effect by insulating the burning surface from the air
- 4. Non-conductor of electricity

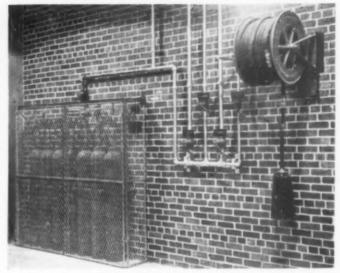
#### DISADVANTAGES

- Possibility of caking of powder in extinguisher
- Expensive clean-up operations required on certain electrical equipment
- Has to be applied at close range, although not as close as CO.
- Not fully developed for remote operation
- 5. Does not permeate readily around obstructions

#### Water

#### ADVANTAGES

- Plentiful supply generally available
- 2. Inexpensive



CYLINDER ASSEMBLY, DIRECTIONAL VALVES AND HOSE REEL ASSEMBLY FOR CO, FIRE PROTECTION OF SWITCHGER, GADSDEN STEAM PLANT, ALABAMA POWER COMPANY.

- 3. High degree of cooling
- Can be applied at considerable distance
- 5. Adaptable for remote operation
- When applied in form of fog, will extinguish flammable liquids

#### DISADVANTAGES

- Generally electrically conductive, except when applied in form of fog.
- Requires drying out of electrical equipment

#### Wetting Agents

The comparatively recent advent of wetting agents which are added to water in order to reduce surface tension, thus increasing the rate of penetration, has a pronounced affect on the ability of water to extinguish fires in closely packed material. Field investigation of possible applications has not been entirely completed at this time and corrosive effects of wet water are also under study.

# RECOMMENDED PROTECTION FOR GENERATING STATIONS

The fire protective equipment found in the average generating station will usually only meet the Underwriters' minimum requirements. Some of the companies that have had serious fires in their plants, have installed additional protective equipment to prevent a recurrence of the same accident. However, they have often failed to make a complete survey of all hazards involved and make provisions to meet all major emergencies.

#### Generator Protection

Hydrogen cooled generators will not require any special fire protective equipment. As long as the proper purity (90%) of the gas is maintained, it is inert, non-explosive and will not support combustion. However, a mixture of hydrogen and air is explosive over a wide range of proportions (from about 5% to 70% hydrogen by volume). If a fire should occur due to extreme carelessness, the machine can be purged with CO, which is provided for purging operations. These CO, cylinders should be connected and should be ready for use at all times.

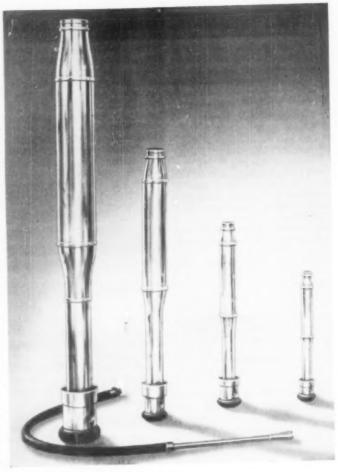
The frame, windings and cooling coils of the hydrogen cooled generator are designed to withstand the force resulting from an internal explosion. It is, therefore, important that the CO, pipe connections to the machine frame be installed in such a way that they will not be torn loose by such an explosion. Since it is necessary that the hydrogen be cut off immediately following such a failure, it would be advisable to provide a remote controlled emergency shut-off valve. An insulation fire resulting from such an accident will not be as severe as a fire caused by a prolonged short circuit, and quick action by the operating personnel can prevent any major damage.

Air cooled generators, designed for air re-circulation through coolers, should be equipped with automatic CO, fire protective systems.

Fire detection can be accomplished by connecting the systems to the generator differential auxiliary relays. Operation of the differential relays is indicative of a potential fire condition. In addition, thermostats should be placed in the hot air duct of the machine for the detection of a fire condition possibly caused by a winding failure or mechanical trouble. A generator CO. system provides for the introduction of an initial supply of CO, which produces a high enough concentration in the machine to quickly kill all flame. Following this, additional CO, is introduced in the form of a delayed discharge to maintain a concentration of not less than 25% of CO in the machine during the entire deceleration period. It may be advisable to include the exciter in such a protective scheme.

The operating engineers' objection to connecting such devices to the generator differential scheme seems to be universal. There have been cases of faulty operations with the consequent loss of cylinders of CO<sub>b</sub>. However, most managements will consider such a loss insignificant compared to a great loss which can be avoided in case of an actual emergency.

Vertical shaft, water wheel driven generators of the open type should be equipped with a CO, piping system and nozzles to protect the upper and the lower end turns of the stator winding. These end turns are not accessible with portable CO, or carbon tetrachloride extinguishers. There is a



AER-O-FOAM NOZZLES.

possibility of a serious fire spreading over the end turns, especially if they are not kept clean. In an attended plant, it is best to arrange the cylinders of such a CO, protective system for manual release. In a non-attended station, the release will have to be automatic. The CO, should be released in two steps. The first application should be immediately following a failure, in order to prevent a flash fire from spreading over the end turns. The second application should not take place until the generator has almost come to a stand-still. It may be advisable to provide as back-up protection to the CO, system, two rings of water pipes with spray nozzles or perforations. There should be an external break in the supply line to this back-up system which requires the insertion of a short hose connection, in order to prevent accidental spraying of the end turns.

#### Transformer Protection

The main power transformers should be located outdoors wherever possible. If they have to be installed indoors, it is recommended that they be placed in rooms which can be isolated and flooded with CO, or water fog in case of fire.

The smaller auxiliary transformers, which are placed indoors, should be of the dry type or the non-inflammable liquid filled type in order to keep the insurance rates low. The dry type transformer is not fire-proof as is generally assumed. Following a heavy short circuit, the binder material in the insulation will burn severely. It is advisable to provide an extension from the nearest CO<sub>2</sub> protective system to the larger units. A fire in the smaller units can usually be handled with portable equipment.

For first aid fire protection around large outdoor transformers and oil tanks, as well as large oil tanks indoors, wheeled dry powder extinguishers, having a capacity of not less than 150 lb of dry powder, nitrogen expelled, are recommended. For protection against fire beyond the incipient stage, a fixed water fog system should be installed. Since fog does not readily travel around obstructions, it is effective only when applied directly on the fire. Hence, care must be exercised in locating and spacing fog heads to insure proper coverage of the entire transformer structure and avoid dead pockets in which fire can linger. For most generating stations, where operators are on duty at all times, manual operation of the fog system by means of a quick-acting valve placed in a protected location, will be satisfactory. For non-attended stations, an automatic system will be necessary. Fire detection devices, actuating a deluge valve in the water supply line should be used. Direct operation of individual fog heads by means of fusible links is not recommended since it is not likely that all fog heads of a transformer will open simultaneously. Furthermore, a wet-pipe system of that type is subject to freezing.

Sufficiently high water pressure is a prerequisite for proper operation of a fog system. While claims might be made for various types of nozzles to produce a satisfactory fog on water pressures as low as 35 psi, good practice demands pressures of not less than 75 psi and preferably 100 psi.

For back-up protection, hydrants should be available in the yard, and 1½-in, hose with fog nozzles should be provided to take care of ground fires in the run-off. A supply of foam liquid and a

foam making nozzle, which can be placed at the end of a 1½-in. hose line, are desirable to blanket a ground fire where re-ignition is likely to occur, such as around heated gravel or in a catch basin.

During a prolonged transformer or a lubricating oil reservoir fire, it is not advisable to drain the oil. Every effort should be made to cool the oil down below the flash point by applying water fog (or solid streams of water if a high wind prevails). Draining the oil will cause heavier damage to the transformer windings and may also result in a tank explosion.

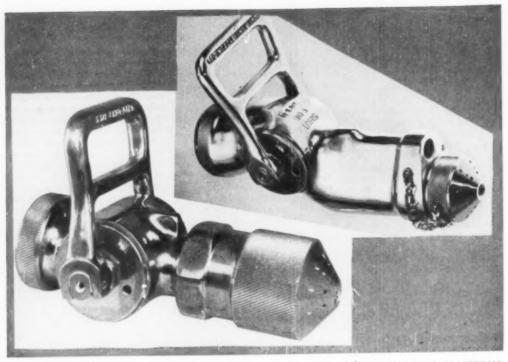
It should be remembered that a solid stream of water will tend to spread the fire if burning oil is overflowing.

#### Switchgear Protection

Station service bus structures containing oil circuit breakers, such as found in old generating stations, present a great fire hazard, since a rupture of a breaker tank will result in considerable quantities of oil being spilled. Sometimes, these breakers as well as transformers and open switchboards are located in a room by themselves, sufficiently isolated, to permit flooding of the entire room with CO<sub>o</sub>. This is true mostly in older plants, built prior to 1930. Where an oil circuit breaker cell

FOAM NOZZLE IN ACTION.





Two position for nozzle OFF and FOG.

THREE POSITION FOG NOZZLE OFF-FOG-SOLID STREAM

structure is located so that the space cannot be flooded, wheeled dry powder or  $CO_z$  extinguishers, having a capacity of 100 lb or 150 lb should be provided.

Metal enclosed air circuit breakers are not fire proof as generally stated. The binder material of the insulation, while difficult to ignite with an open flame, will blaze most severely in the presence of an electric arc during a heavy short circuit. Such a fire is difficult to extinguish as many utility companies have already experienced. Some of the compartment sections (bus, instrument transformer, etc.) are not readily accessible in case of an emergency. The metal enclosure may be energized, following a fault. The potential gradient may be dangerously high if the ground connections are burned off. The most effective means to combat such a fire is by providing remote controlled, builtin, CO, fire protection. CO, discharge nozzles should be located in the bus compartments, and instrument transformer compartments, as well as in all breaker compartments. It is advisable to ground the pipes leading to the switchgear.

Such a system consists of a battery of 50 lb or 100 lb CO, cylinders, arranged to be discharged in two or more groups with the necessary directional valves, cross-over valves and cylinder release mechanisms.

If two or more such systems are installed in a power house, it is advisable to interconnect them by means of a header, thus permitting one system to be used as back-up or reserve for the others.

A hose reel assembly with discharge horn and control valve should be connected to each battery of cylinders through a directional valve, for use in moppingup operations.

The systems in the power house should be arranged for manual operation and the system provided for the protection of any remotely located coal handling switchgear should be equipped for automatic

Provision for a three-shot operation is recommended on such a built-in system. During the first operation, which is the soaking-in period, the gas will have to be introduced in quantities calculated to produce a heavy fire killing concentration. This soaking-in period is of particular importance in the case of metal enclosed switchgear since it is necessary that the gas not only flood the compartments, but also permeate the spaces between all control wiring, operating coils, insulated parts, etc. This will create an inert atmosphere within the cubicles over an appreciable period of time and permit the heated materials to cool down. Following a heavy fire, a second introduction of gas is usually necessary to replace some of the gas lost through the louvres and other openings and thus prolong the cooling down period. The third operation is usually confined to mopping-up operations in the

compartment where the fire originated.

Outdoor oil circuit breaker fires should be handled the same as transformer fires with 1½" fire hose and two position nozzles (Off and Fog).

#### Turbine Protection

A severe fire hazard exists by the presence of large quantities of lubricating oil in turbine reservoirs and piping located in close proximity to high-temperature steam lines. Also, oil tanks, filters, hydrogen detraining units, pumps and other auxiliaries, requiring maintenance and service work, might expose oil to high temperatures, sparks or open flame.

To control a fire of this type, once the stage of inciplency has passed, means have to be put in action which will:

- Reduce the heat, so as to enable operators to advance
- b. Combat smoke, to enable operators to see what they are doing and what headway they are making
- c. Extinguish the fire by cooling the inflammable material below the ignition point or blanket the fire so as to exclude oxygen.

These conditions of extinguishment are best met by the use of water fog. Finely divided water, in the form of fog, will act as an insulating shield, behind which operators can safely advance against the fire. Fog will beat down flame and consume smoke and thus clear the atmosphere. Finally, because of its finely divided nature, fog traveling through flame, will readily vaporize. As a result, a substantial part of the water used on the fire will turn into steam, thereby removing large quantities of heat from the fire. The steam in turn. creating a blanket, will tend to smother the fire.

True fog is considered a nonconductor and perfectly safe for operation by personnel on station service voltages. Since rapid control of the fire is of primary importance, the damage done by water fog to exposed electrical equipment is of minor consideration. If the structure permits, it is advisable to install a water pipe with fog heads around the oil reservoir with the control valve at some distance from the turbine and from the main steam line. With a fog curtain arrangement of this type, a possible oil fire can be kept sufficiently under control so the reservoir can be approached with portable equipment.

The most important point is that the oil reservoir tank be kept cool. Dumping of the oil is not recommended due to the explosion hazard involved. However, should it become absolutely necessary to dump the oil into the building sump (due to a reservoir tank rupture, etc.), it is recommended that foam be discharged into the sump, so as to provide a foam blanket of not less than four inches in depth.

#### Motor Protection

Fires in motors of the open type are best handled with portable one-gallon carbon tetrachloride extinguishers since it is possible to direct a stream of the extinguishing fluid into the motor from a distance of 20 ft to 30 ft away.

In case of a fire in a semienclosed or enclosed motor, it is best to use portable carbon dioxide extinguishers.

#### Coal Handling Protection

Due to the presence of coal dust in and around pulverizers, crushers, conveyors, etc., an explosion is within the realm of possibility and the likelihood of a resulting fire cannot be overlooked. While the fire damage will be small in comparison with the explosion damage, provision should be made to extinguish scattered burning coal, rather than to permit it to burn out. This is best accomplished with a fire hose and fog nozzle. The installation of water pipes with the necessary number of fog heads is recommended at the conveyor transfer points in the boiler room and on the tripper gallery for this purpose. The latter should be of the enclosed type to prevent clogging.

A fire hose with a fog nozzle should be provided at the coal crushers and at the pulverizers. Several portable 15 lb CO, extinguishers should be available for

mopping-up operations around the coal handling equipment. Where large quantities of oil are present in the pulverizer bearings, it may be advisable to have a 100 lb CO<sub>t</sub> extinguisher located so as to be quickly available.

#### Roof Protection

Where the roof covering is combustible, it is recommended that a 1½-in. fire hose connection be provided inside the exit to the power house roof and also to the boiler room roof.

#### SUMMARY

For fire protection with water, it is recommended that main headers be provided through the full height of the building with two or more stations on each floor. These stations should consist of two 1½-in. gated outlets with sufficient 1½-in. fire hose, single jacket, rubber lined, with three-position nozzles.

The first position on the handle of a three-position fog nozzle is "Off". The next position into which the handle snaps is "Fog". The third position is "Solid Stream". This is for the purpose of preventing a man accidentally changing directly from "Off" to "Solid Stream" when fog application might be called for. If solid stream is called for, the second or so delay during which fog is discharged will not hurt anything. On the other hand, if a fire requires fog and the operator accidentally lets go with a solid stream, it might be dangerous.

Three position nozzles should not be used in locations where there is likelihood of electrical shock due to application of a solid stream against energized highvoltage equipment. In such locations, two position nozzles, providing for "Off" and "Fog" should be used. In a smaller measure, this would also apply to nozzles used around large oil tanks, where the application of a solid stream might tend to scatter the fire. For protection of the outdoor equipment, there should be provided the necessary number of fire hydrants with 13/2-in. hose and two position nozzles (Off and Fog).

For the fixed water fog piping of a large transformer, a flow of about 300 gpm of water should be sufficient. Two 1½-in. hand lines with fog or foam nozzles will require a flow of about 150 gpm.

A permanent pipe line with fog heads for the protection of the coal handling sections should be provided.

As mentioned before, the recommended water pressure is 100 psi at the nozzles. If the corresponding static head is not available, a fire booster pump will be required. This pump should be located in a protected space where it will be accessible under any condition likely to occur. Automatic starting of the pump is desirable. The pump drive should be taken from the most dependable power source available. In a steam generating station, where steam should be available at all times, it may be best to install a turbine driven pump. This will also give the advantage of easy speed variation. The capacity of the pump should be 750 gpm against 150 lb discharge pressure, utilizing whatever positive suction head might be available.

If possible, the fire system should be segregated from the house service system. The risers should be at least 4-in.

A 50 ft length of hose should be kept permanently connected to one of the outlets at each station on each floor. At the end of the hose, there should be connected a fog nozzle with shut-off valve. A section of spare hose should be kept in readiness for the other outlet at each station.

For the purpose of permanently blanketing a pool of liquid, or to insulate the sides of a tank, a foam-making nozzle and a supply of liquid foam should be kept on

each floor. The foam nozzle can be connected to the spare hose, thus permitting two men, one using fog, the other using foam, to advance against the fire, side by side. The foam nozzle recommended performs by sucking foam liquid into the water stream and then aspirating air into the waterliquid mixture to produce foam at the nozzle exit. Foam liquid is available in 5 gallon cans, and three to four 5 gallon cans will suffice for about 5 minutes operation of a 115-in, nozzle. Foam should not be used on open or rotating electrical equipment.

Possible fires in air preheaters and breechings are the direct result of carelessness and inefficient operation against which there is no practical fire protection.

Fire partition walls, subdividing the power house substructure, are desirable.

Good housekeeping is the prime requisite of good fire protection. Generator and motor windings, as well as their housings, should be kept free from lint and oil. Air ducts should also be cleaned periodically. Flammable materials, including liquids should be stored in a separate house and they should not be kept around the plant any longer than required. Flammable liquids should not be used indoors for cleaning purposes.

Certain color schemes may be desirable to distinguish the different types of extinguishing ap-

It is advisable to paint a large colored square on the wall behind the fire apparatus.

Monthly fire drills should be compulsory to acquaint the personnel with the location of the

#### RECOMMENDED COLORS

Red & White for CO<sub>8</sub>
Yellow for Foam
Green for Tetrachloride
Red for Water
Red & Yellow for Dry Powder.

fire apparatus and also with the use of this equipment.

A fire alarm system is recommended. The alarm signal can be coded so that it indicates what or where the fire is and thus enables each man to proceed to his assigned fire station.

It is advisable to keep two or three gas masks on hand for use in case a room or area has to be entered by the personnel where a considerable amount of carbon tetrachloride has been discharged during the fire.

Rooms which have been totally flooded with CO<sub>s</sub> gas, must be ventilated before allowing entry by personnel.

This article is not intended to cover minor hazards of ordinary occupancy, if and when found in generating stations. Its primary concern is the protection of expensive, revenue producing equip-

While, in the space allotted, it has been possible only to discuss the most important aspects of the problem, the data presented should be sufficient to enable the engineer to make the proper selection of the fire protective equipment best suited for his plant, or to improve existing installations which are inadequate in the light of modern development in fire protection technique.

### Reprints Available

### FIRE PROTECTION FOR GENERATING STATIONS

Price \$1.00 (Discount on large orders)

The Editors, Southern Power & Industry, 806 Peachtree St. N. E., Atlanta, Ga.

## Santa Claus Moves South



THIS PLANT DEVISED MACHINE SILVERS THE INSIDE OF ORNAMENTS. THE HEAD REVOLVES SLOWLY, AND AT THE SAME TIME THE HOLDERS SHAKE UP AND DOWN TO DIS-TRIBUTE THE SILVERING SOLUTION. THE WATER SPRAY SETS THE WARM SOLUTION.

By Guy Browning Arthur

Even if production experts shower its procedures with question marks, this Maryland plant offers many unique hand operations in producing 60 per cent of the nation's Christmas tree ornaments.

SANTA Claus has one of his most important suppliers in a big plant south of Baltimore—the Santa Novelties Company of Savage, Maryland.

Encouraged by the sale of a small novelty piece to Wool-worth's during World War II, the plant went into full scale production of glass balls and spikes. Headed by Harry Harrison Heim, the company works closely with Corning Glass Works, collaborating on the development of new processeses and designs.

#### Processes

The processes in the plant are arresting because so much of the work is accomplished by simple hand skills taught right in the plant. Glass blowing is considered a lost art in this country, because everything but novelties is blown by machines. Here they teach local labor how to use the heating units and how to blow the balls and spikes. Those who do the decorating must be taught and even the packing requires such care and skill that good training is essential for a minimum of breakage.

It may be that this hand blowing and decorating will give way to more mechanical processes, but as it stands at present we see an industry which devises many unique gadgets used by hand labor, and produces more than half of the gaudy trinkets that help to make Christmas a showy and satisfying carnival.

#### Standardisation

Any observer with a knowledge of mass production will ask why more of this decorating and handling is not done by machines. The best answer is that all the pieces are sized by the eye, and all decorating reflects the individual taste of the decorator. There isn't what can be called a standard for the size or the pattern. Roughly the pieces fall into sizes, and can be packed in partitioned boxes, but that is about as much as can be said for standardization.

Starting with about \$1000 in cash the Heims, father and son, have built up a stable business with a product which is in great demand. When they left their original business and started out to learn how to make glass ornaments they sank all they had accumulated—about \$10,000—in the learning. Since then they have bought Savage, set up a San Diego branch, and have both plants running to capacity.

The most interesting aspect of the industry is that it is making an important luxury item, and doing its duty as an industry in making money. But it stands somewhere between modern production methods and the community idea of an establishment devoted to the welfare of its workers. This leaves a satisfying operation, at least—even if production experts do shower its procedures with question marks.

THIS GIRL IS TOUCHING UP THE LEAVES IN A DESIGN SO RAPIDLY THAT ONE CAN SCARCELY FOLLOW THE STROKES OF HER BRUSH.



### NINE TO ONE IN BOILERS at

#### THREE-FUEL DESIGN

Basic fuel is coal fired by spreader stoker. Oil burners designed for application of gas rings provide for easy transition to alternate fuels. By W. H. Fisher

Plant Engineer Kerr Bleaching & Finishing Works Concord, North Carolina

NE new steam generating unit, replacing nine old boilers, has made possible reduction of boiler room floor space by 46%, an increase in steam capacity of 50%, and reduction of fuel and operating cost by over one-third at Kerr Bleaching and Finishing Works, Concord, North Carolina.

#### History

Sixty years operation of this company has used untold quantities of steam and has worn out numerous boilers. In 1948, the plant

found itself with nine HRT boilers, some stoker and some hand fired, with a total rated capacity of about 1400 bhp. Steam adequate to maintain plant productive capacity was not being generated; starting of one process frequently necessitated shutting down another to maintain reasonable pressure. Process water throughout the plant was heated at the point of use by mixing in live steam or by direct coils. While most condensate was returned to the boilers, no heat was recovered from waste hot was recovered from waste hot was

ter and liquors. In the two boiler rooms, instruments were limited to pressure gauges, and coal was handled by wheelbarrow and shovel.

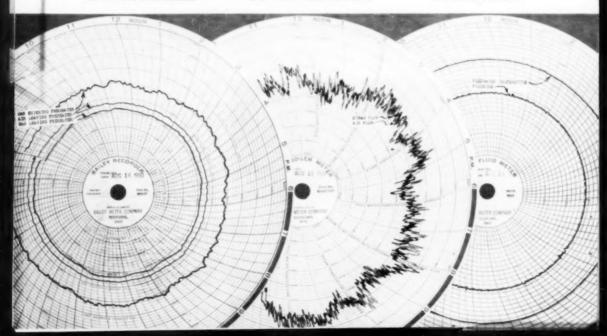
Arrangement of the steam distribution system was such that accurate determination of over-all steam consumption was impossible, but a study of such data as was available indicated an average requirement of 47,000 pounds of steam per hour to maintain normal plant production. Consideration of the factors inovived showed that it would be more economical to purchase electric power rather than to generate it, so a long range program of modernization of steam

CHARTS SHOWING BOILER OPERATION, NOTE UNIFORM STEAM PRESSURE IS MAINTAINED EVEN THOUGH LOAD FLUCTUATIONS ARE SHARP.

AIR AND GAS TEMPERATURE.

STEAM FLOW AND AIR FLOW.

FEEDWATER TEMPERATURE.
AND STEAM PRESSURE.



## **Kerr Bleaching and Finishing Works**

BOX SCORE shows THE RESULTS

	OLD	NEW	COMPARISON
Number of Boilers	9	1	Nine to One
Capacity, Blr hp	_ 1,400	2,100	50% Increase
Floor Space, sq ft	5,600	3,000	46% Reduction
Firemen per day	18	6	67% Reduction
Coal, Tons(comparative basis)	_ 1,900	1,150	40% Savings

generation, steam utilization, and waste heat recovery facilities was begun—the first step in the program to be a new boiler plant.

Five of the nine HRT boilers were retained for standby use, and while they will not carry full plant load, the new unit is considered so reliable that only emergency standby is required.

Studies showed that coal should be the basic fuel, Consideration of investment, wide range of loads, rapid load swings, and electric power consumption led to the selection of a spreader stoker as more suitable than either underfeed stokers or pulverized burners.

In the fall of 1948, orders were placed for a complete new boiler plant, and construction was begun in the spring of 1949, with an original target date of late fall 1949. The new unit went into operation in early February 1950.

A new location at the north end of the plant site was selected for the new boiler house, and space occupied by one of the old boiler houses was converted to plant production.

#### Steam Generator

The boiler proper is a Babcock and Wilcox, FJ 18-52, rated at 60,-000 lb/hr continuous and 70,000 lb/hr peak load on coal, oil, or gas. Designed for 250 psi, it is operated at 150 psi—the limit of the old steam distribution system. With its waterwalls, secondary furnace, refractory and metallic baffles, cyclone steam separators, 4 inch insulation, and steel casing, it has shown itself to be a very efficient unit.

A Detroit RotoStoker with steam powered dump grates, three B & W Oil-Gas Burners, a B & W tubular type air heater, a Western Precipitation dust collector, a Detroit cinder return system, and Sturtevant induced and forced draft fans constitute the remainder of the major items of the steam generating unit, which is controlled by a Bailey pneumatic system. Trim includes

Diamond soot blowers on the boiler and air heater, a Reliance water column, Yarway blowdown valves, and Consolidated safety valves.

All internal boiler surfaces were coated with Apexior paint applied by Carter Boiler and Tank Coating Service.

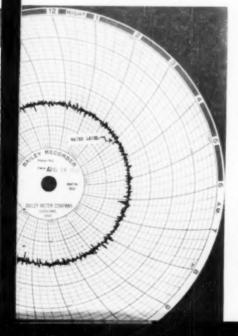
Oil burners, designed for application of gas rings, are built as an integral part of the unit, for easy transition to the alternate fuels, without any change to the firing equipment, This is the first spreader stoker coal fired boiler in North Carolina equipped to burn both oil and gas as alternate fuels.

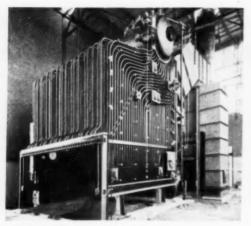
Boiler brickwork was done by Piedmont Products Company, and the boiler and auxiliaries were insulated by Reid Hayden, Inc.

The stoker is composed of four feeder units, driven in pairs by 1 hp motors. Flyash from the boiler passes, air heater hoppers, and the dust collector hopper is returned to the furnace by a pneumatic system, which also supplies the rear overfire air. Overfire air through the stoker front is supplied by a separate blower. The combustion system has carried loads of less than 1/5 nominal rating, 12,000 lb/hr, and as high as 11/2 nominal rating, 90,000 lb/hr, smoothly and efficiently. This is a load range of 71/2 to 1, on automatic control.

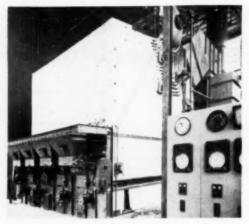
Normal one-day shutdowns over week-ends are by "hold fire" operation, during which pressure is not maintained, but furnace temperatures remain high enough to

BOILER WATER LEVEL.



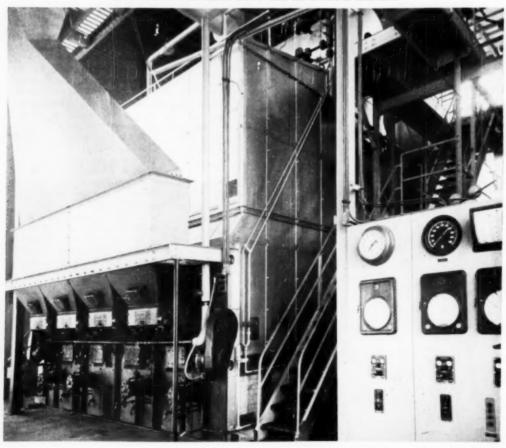


BOILER PRESSURE PARTS, COMPLETED AND READY FOR IN-STALLATION OF REFRACTORIES AND INSULATION.



REFRACTORIES AND PART OF INSULATION INSTALLED. STOKER IS IN PLACE AND CONTROL PANEL IS INSTALLED.

THE COMPLETED INSTALLATION SHOWN AFTER SIX MONTHS OF OPERATION.



permit going on the line rapidly without excessive fuel consumption. This is accomplished by operating only the induced draft fan, with ash pit doors open, and intermittent feeding of coal by manual control.

When the stoker grates are dumped, ashes fall into a basement ash pit. Provision has been made in the design for the addition of pneumatic or hydraulic ash handling equipment if justified in the future. Currently, the ash is loaded and hauled away by local purchasers.

Start-up experience with the pneumatic cinder return system indicated that valves in the air supply lines are needed to properly adjust air distribution. Elimination of all possible bends in the return lines (to prevent clogging) is also desirable.

The furnace turbulence created by the combination of front and rear overfire air jets and the cinder return discharge nozzles has produced clean combustion conditions, with no heavy slag accumulations experienced.

Consistent maintenance of overall design efficiency has in no small part been aided by good air heater efficiency. Flue gases are cooled from about 500 F leaving the boiler to about 330 F leaving the air heater, forced draft air being raised from room temperature to about 330 F. The scrubbing action of the flue gases eliminates need for blowing of soot in the air heater when firing with coal.

#### Controls

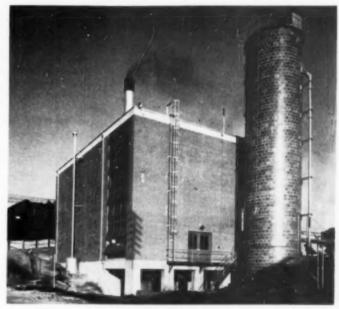
Bailey power drives operate the fuel feed, induced draft damper, and forced draft damper; Bailey diaphragm type operators regulate the feedwater valve and front overfire air fan damper. Fuel feed is controlled by master steam pressure. The steam flow-air flow ratio from the boiler meter is coordinated with master steam pressure for control of air flow by regulation of the damper at the outlet of the induced draft fan.

Feedwater control is the Bailey two-element type, steam flow and drum water level being integrated to provide very accurate and steady drum water level.

The forced draft fan inlet dam-

per is controlled by furnace draft, and the front overfire air is paralleled with fuel feed. During the early days of operation, the normal and expected adjustment to provide steady water level and to parallel steam flow and air flow at all loads were necessary, but the fundamental system of control has been very satisfactory. Quick response to change in load, absence

boiler house and the mixture is pumped into a deaerating feed-water heater. Steam from the main header, reduced to 3½ psi, is fed to a Swartwout 90,000 lb/hr capacity heater which heats the feedwater to 220 F. The installation of an exchanger for recovery of heat in the continuous blowdown, with the flash steam going to the feedwater heater, is contemplated.



EXTERIOR VIEW OF STEAM PLANT.

of hunting, maintenance of steady pressure and water level, and close coordination of steam and air flow over wide load fluctuations, are shown by daily operating charts.

A 5 hp air compressor, with a duplicate standby unit, supplies air for the Bailey control system. Air piping is so arranged that both compressor can supply both tanks. der pressure at all times, and either compressor can supply both tanks. This provides maximum air supply in the event of failure of the compressor in use, and gives ample time to start the standby unit.

#### Feedwater System

The finishing plant returns as condensate about 50% of the steam produced. An automatic float valve brings raw city makeup water into the condensate receiver tank in the

A 160 gpm two-stage centrifugal pump, driven by a 40 hp motor, handles the feedwater from the heater to the boiler. A Copes pressure regulator provides constant pressure drop across the feedwater regulating valve. Nalco feedwater treatment is used, and analysis of boiler water is made daily.

All drives are by electric motor, the only steam-powered auxiliary being a Worthington, duplex type, reciprocating feedwater pump for emergency use. Duplicate installations were made of the Goulds boiler feed, condensate return, and receiver pumps. Spare motors are provided for all other important drives.

The induced draft fan is driven by a 100 hp, variable speed, wound-rotor motor, with a constant speed motor of equal capacity mounted on the opposite end of the double extended fan shaft, for standby service.

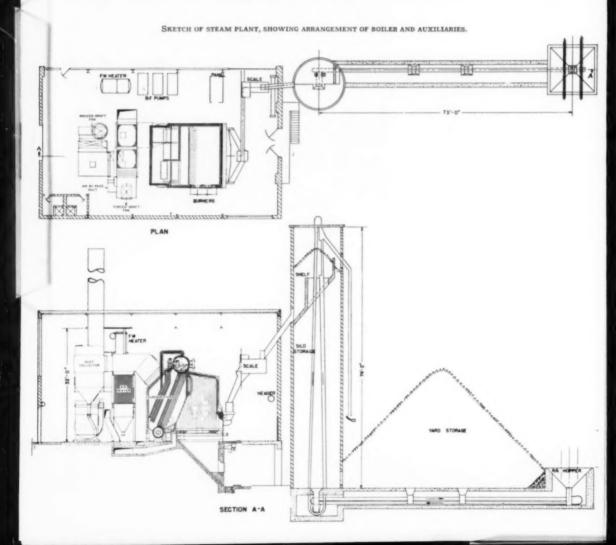
#### Coal Handling

The Redler coal handling equipment, furnished by Stephens-Adamson Mfg. Company, is of the continuous flow type, and is dust-tight throughout. A 73-ft conveyor in a concrete tunnel under the dead storage yard brings coal from a railroad track hopper into the base of the coal silo at a rate of 25 tons per hour. The elevator in the 250ton capacity tile silo delivers the coal to a 50-ton capacity storage shelf of reinforced concrete and when that is full, it spills over into a 200 ton dead storage space. From the storage shelf, the coal is fed through a gravity chute to a Richardson automatic scale inside the boiler house. Another conveyor delivers the coal from the scale to a non-segregating distributor located over the stoker hoppers. To provide maximum live supply of fuel, the standard stoker hopper was increased in height by three feet.

Control of the inside conveyor is by high- and low-level switches located in the distributor and adjusted to maintain a minimum level of coal. Control of the outside conveyor and elevator is by manual push buttons.

Internal arrangement of the silo is such that coal is first delivered to the storage shelf, subsequent coal spilling over into the 200 ton dead storage portion below. When the silo is filled to capacity, additional coal falls through an overflow chute and is stacked on the storage yard by a Swiveloader. Hoppers in the bottom of the silo and two hoppers opening into the outside conveyor permit selective return of dead storage coal from the silo or storage yard to the shelf. Design and arrangement of the inside conveyor and coal scale will permit the present silo to serve a future boiler by addition of another conveyor.

To maintain the modern, cleancut lines of the boiler house and silo, the elevator was installed inside the silo. It has been found, however, that mounting on the outside would have been more advantageous from an operational



#### Principal Equipment -

#### Steam Generating Unit - Kerr Bleaching and Finishing Works

#### STEAM GENERATING PLANT

FJ 18-52 Integral Furnace Boiler, 7900 aq ft heating surface including waterwalls; 60,000 lb/hr; 250 paig. Boller .. paig.

. One Detroit Stoker Co. Roto-Stoker Stoker, spreader ty ered dump grates. der type, with four rotors, steam pow-

#### CONDENSATE AND FEEDWATER SYSTEM

Feedwater Heater ...... One Swartwout Co. size 36 de-aerating feedwater heater; 90,000 lb/hr; low pres-

Sout Blowers Diamond Power Speciming Boiler Brick Work Predmont Products Co., Charlotte, N. C.—Mexico Refractories.

Boiler Insulation Revid Hayden, Inc., Charlotte, N. C.—Johns Manville Materials.

Boiler Internal Coating Carrer Houler and Tank Coating service, Atlanta, Ga.—Apexior. 

Allis 5 hp motor.

One 15 ton/hr driven by Louis Allis 3 hp motor. 9-in. Redler type; 25-ton/hr driven by Louis Allis 15 hp meter. Elevator

Silo

15 hp meter.

One Kalamazoo Tauk and Silo
Co. 6-in. hollow tile; 14 ft diameter by 74 ft high
inside. 200 ton dead storage capacity with 50 ton
capacity live storage shelf.

Stacker

'Swiveloader'.

One Stephens Adamson Mfg. Co.

#### CONTROLS

Combustion Control ... Bailey Meter Company Feedwater Coutrol ... Bailey Meter Company Feedwater Heater Steam control ... The Swartwout Company

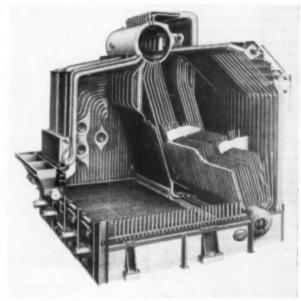
control . . . . . . . . . . . . The Swartwout Company Compressors for Control Air . . Two—The Worthington Pump & Machinery Co. . 5 hp.

#### BUILDING AND EQUIPMENT

standpoint, to permit periodic inspection and access for maintenance. Trouble with arching of wet, fine coal on the silo storage shelf, at the entrance to the gravity chute leading to the scale, has been reduced by the use of a vibrator on the chute. It is felt that use of steel instead of concrete for the shelf would solve the problem, because of the difficulties of finishing concrete to a smooth surface on the required slope of about 50 degrees.

#### Arrangement

All major items of equipment, with the exception of the feedwater heater and coal scale are located on the operating level, giving maximum accessibility for inspection and maintenance. Control is centralized in a panel located to the right of the boiler, electrical disconnects and starters being grouped on a matching panel placed back to back with the control panel. A raised grating between panels provides ready access to the rear of both, as well as space for interconnecting piping and conduit. Steel grating catwalks at two levels above the firing floor give accessibility to all furnace inspection ports, drum connections, accessories, feedwater heater, coal scale, and inside conveyor.



CUT-AWAY VIEW OF BOILER AND STOKER SHOWING LOCATION OF OIL AND GAS BURNERS, STOKER GRATES, AND EXTENSIVE WATER COOLING PROTECTION OF ALL WALLS.

maximum use of welding in the in- main is the use of aluminum jackmain leading to the finishing plant. for 250 psi operation. An out-

stallation of the boiler house piping eting, furnished by The Childers and the 500 ft overhead steam Manufacturing Company and applied, together with the insulation, All new pipe work was designed by Guy M. Beatty, Inc. Pressure sensitive tape was used to fasten The Grinnell Company made standing feature of the new steam the jacketing. The completed covering has a clean cut appearance, and shows promise of requiring little maintenance.

#### Building

The design of the building is considered a good example of contemporary architecture. One side of the building is of corrugated asbestos mounted on a metal frame in order that the building may be expanded in the future to accommodate one or more additional units.

Considerable attention was given to the placing of windows to give the best possible natural lighting and natural ventilation. Windows at either side of the structure but in front of the operating panels and in front of the boiler extend from floor to ceiling. A large panel of windows at the rear of the boiler, going from wall to wall and extending from the roof half-way down the height of the wall together with those previously mentioned comprise all the windows in the building.

On extremely hot days the lower part of the front windows at ground level and the higher windows can be opened, thus creating a natural draft at floor level in front of the boilers for the operators, and then up and over the boiler and out the rear windows near the ceiling level.

#### Operation

The operators of the new boiler plant were selected and employed several months prior to initial operation. During these months they worked on the installation of the stoker, controls, and power and control wiring, gaining first hand knowledge of these vital elements, as well as close observation of the installation of the boiler and piping. The value of this practical background is evidenced by the fact that these operators, with no previous experience in a plant of this type, have consistently maintained design efficiency of 84%, with no unscheduled shutdowns chargeable to personnel.

Operation is normally continuous, with fires banked one day over each week-end. An operating crew consists of an operator and one helper on each 8-hour shift. Use of a "swing shift" crew permits rotation of days off so that each crew works on a schedule of six days on and two days off.

The shift log sheet is designed with the two-fold purpose of record and check list; hourly readings of the various instruments are recorded for operational data, and hourly checks are made on operating conditions of equipment. The sequence of the log sheet is such as to insure a complete circuit of the entire unit and auxiliaries every hour.

A thorough inspection of the new steam generating unit was made about six months after initial operation, and all internal and external surfaces were found to be in excellent condition.

During the time the new unit has been operated a variety of coals have been tested, covering a wide range of volatile content, ash content, ash softening temperature, and size. These tests have shown the unit capable of burning satisfactorily coals of very different characteristics, thus allowing selection primarily on a basis of cost per

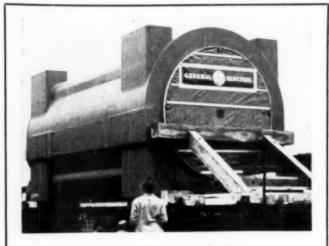
thousand pounds of steam.

Preliminary steps in steam utilization and heat recovery in the plant proper have been taken by the installation of process water heating equipment. The incoming process water is first heated in an exchanger by plant condensate, and is then brought to final temperature in a storage type heater utilizing a direct steam coil. The next step contemplated is the installation of an exchangeer for the recovery of heat in waste liquors and water.

#### Results

With the steady pressure, ample steam, and dependable operation demonstrated by the new boiler plant, finishing plant production in both quantity and quality has reached new highs, and accuracy of scheduling orders has greatly improved. Fuel savings in the neighborhood of 40% have been experienced, as well as substantial reduction in the payroll and maintenance costs for steam generation.

Changing from "nine to one" has meant real economy.



**Huge Stator for Georgia Power** 

Weighing more than 375,000 lb, this huge stator for a 90,000 kw generator is the heaviest single piece of equipment ever shipped by G. E.

Equipment, part of a steam turbine-generator set, was constructed by the G-E Turbine Divisions at Schenectady, N. Y., for installation in Georgia Power Company's new Yates plant near Newnan, Georgia.

To assure that railroad facilities could accommodate the stator when it was shipped, characteristics of various routes to its Georgia destination were considered when the machine was being designed.

### Southwide Chemical Conference

### Tremendous Growth in the Southern Chemical Industry Emphasized at Atlanta Meeting

EMBERS of Southern Association of Science and Industry and members of American Chemical Society (Georgia Section) sponsoring jointly the SOUTHWIDE CHEMICAL CONFERENCE in Atlanta Oct. 16-18 emphasized importance of the Southern chemical industry more forcefully than any other recent event. Important scientists presenting and hearing over 80 papers keyed to improvement and advancement proved that the industry has already reached enormous proportions.

Three papers briefly abstracted here give a

fair idea of what chemical leaders are thinking and doing in the South. Heavy chemical production is proving the value of Southern resources, but much remains to be done toward further processing of these basic materials into consumer products.

The most realistic Southern advances will come as more Southern processors start taking the products of these giant plants and finishing them all the way into drugs, detergents, coatings, plastic products, and so on for the fast growing Southern market.

### The Chemical Industry and The South

By L. S. Roehm

Director of Technical Service and Development Dow Chemical Co.

M ANY large chemical companies have established manufacturing operations in the Southern states, especially in the Gulf Coast area, and we have every reason to believe that new chemical plants will be constructed in the South, and that the plants already located there will continue to expand.

On the Gulf Coast, Dow and other producers use natural gas and petroleum as raw materials to produce a host of important familiar organic chemicals that include carbon tetrachloride, used in dry cleaning, and in fire extinguishers and industrial degreasing . . . chloroform, which has important industrial solvent uses as well as its better known medicinal applications . . . glycols, extremely important for permanent type anti-freeze, humectants, plasticizers, solvents, in countless products such as cosmetics, hydraulic fluids, flavorings and

The inorganic field, while showing less spectacular growth, has by no means stood still. The production of caustic soda, chlorine, sulfuric acid, calcium chloride and similar inorganic chemicals has

expanded steadily and sufficiently to cope with the product requirements of industrial growth. And industy has grown.

Highlighting just a few fields will show quickly what has happened to the industry in the South since pre-World War II

The broad industry classification "Chemicals and Allied Products" includes industrial chemicals, drugs and medicines, vegetable and animal oils, fertilizers, soap and toilet preparations, and various household, industrial and agricultural specialties. The South had about one-third of this industry in 1939 and the same in

Industrial inorganic chemicals however, show a definite shift favoring Southern location. The South had only one-fifth of this industry in 1939, and nearly onethird in 1947. In industrial organic chemicals the share of the South remains at about one-half.

Synthetic fiber manufacture, largely rayon, is a part of the organic chemicals industry which has always been concentrated in the South

where classified) are heavy organic chemicals which are lumped together largely because they fit in no other group. This is what we regard as the basic organic chemical industry and the South's share of it increased from onequarter to one-third between 1939 and 1947.



L. S. Roehm

Another branch of the chemical industry which has traditionally concentrated its operations in the South is the fertilizer industry.

The accelerated growth of the chemical industry in the South has not been general, but has been confined principally to the manufacture of basic industrial chemicals, both inorganic and organic, and to the manufacture of plastic materials.

The alkali and chlorine in-Organic chemicals (not else- dustry has as its major raw ma-



terial common salt, which it uses at the rate of more than ten million tons per year, almost two-thirds of the total salt produced in the country. Nearly three quarters of the salt used by the chemical industry goes into the production of soda ash and most of the rest of the salt used by the chemical industry is converted to caustic soda and chlorine by passage of an electric current through a strong brine.

The particular requirements which dictate the locations of new plants in the alkali and chlorine industry are: first, a nearby source of salt, and second, cheap electric power. The salt deposits in the states of Texas and Louisiana produce more than one-fifth of all the salt made in the United States, and are near to sources of petroleum fuels. These factors had much to do with the establishment of the several large alkali and chlorine plants along the Gulf Coast,

A large segment of the organic chemicals industry has benzene as its basic raw material. Benzene, a by-product of the manufacture of coke for steel production, is consumed by the chemical industry at a rate exceeding 150 million gallons or one billion pounds per year.

The majority of the country's benzene is produced in the steel making centers of Pittsburgh, Cleveland, Detroit, Chicago and Birmingham. However, proximity to a source of benzene has never

been a criterion for location of a benzene consuming chemical plant. For example, both the Dow Chemical Company and the Monsanto Chemical Company have constructed large styrene producing facilities on the Gulf Coast far from the steel producers but near, of course, to the other necessary raw material, ethylene, and located so benzene may be brought in by barge over the Ohio and Mississippi rivers.

Benzene can be produced from petroleum and small amounts are being so produced at present. When price considerations permit, as they probably will in the near future, we may expect to see the petroleum industry of the Southwest become a major supplier of benzene to the chemical industry.

Petroleum, one of the major natural resources of the Southwest, is becoming increasingly important as a raw material for chemical manufacture. Twenty-five years ago the nation's production of petroleum-derived chemicals was in the neighborhood of 150,000 pounds per year. In 1950, it is estimated that 8 billion pounds of chemicals will be made from petroleum.

#### Reasons for Expansion

The availabilty of petroleum and natural gas for the manufacture of these and other petro-chemicals is, of course, one of the most important reasons for the expansion in recent years of the chemical industry of the Gulf Coast. You can see that the requirements of three segments of the chemical industry in many cases make location in the South advantageous from the standpoint of raw material and energy requirements.

There are, of course, other reasons for the location of a manufacturing enterprise in a certain area. One of these factors is accessibility of markets. The South's well developed textile and paper industry, as well as its generally improving economy, offer expanding markets for chemical products. Chemical producers are becoming increasingly aware of the needs of this area. Our own company has recently established a marine terminal at Charleston, South Carolina, and a sales office in Atlanta, so it may better serve the South Atlantic area.

In this period of rapidly rising transportation costs, the expense of getting a product to the market must be considered seriously by a manufacturer who plans to build a plant in a new location. The South, and particularly the Gulf Coast South, are admirably suited in respect to the availability of cheap transportation. The middle West can be served by barge over the Mississippi and Ohio River systems and the entire Atlantic Coast by ocean going transport. Water transportation facilities are being increasingly used by chemical producers in this area.

# **Expanding Petroleum Markets**

# By Frank J. Soday

Lion Oil Company El Dorado, Arkansas

NEW chemical empire is A being forged in the Southwest, one that promises to surpass the older chemical centers in other sections of the country and to make the South one of the major centers of chemical industry in the United States. This industrial revolution started during the depression years of the 1930's. Moving slowly at first, it gathered momentum rapidly and was proceeding with great vigor in the years just prior to World War II. Stimulated by the establishment of war industries throughout the South in the eventful days following Pearl Harbor, it rapidly attained its majority and is now challenging older chemical producers in many fields for supremacy. In its growth and swift maturity, it has surpassed even the most optimistic hopes of its founders.

Since the end of World War II, more capital has been invested in chemical plants in the Golden Horn along the Texas-Louisiana Gulf Coast than in any other chemical producing area in the country. The industrialization of the South is proceeding at a rate of 43 per cent above that for the country as a whole.

The beliwether of the expanding chemical industry in the Southwest is petrochemicals, derived from the supplies of petroleum and natural gas available in this area. In fact, natural gas may be said to be the prime material resource of the South, serving both as a basic raw material and as a source of heat and power.

This dependence upon petroleum, a team which also includes natural gas, by the rapidly developing Southern industry is not unusual, although in no other section of the country is this relationship so pronounced. Petroleum has rapidly become the most important basic raw material of our industrial civilization. The age in which we now live, this age of tractors and automobiles, airplanes, oil burning ships and locomotives, and oil-heated homes, is truly an age of oil.

No industry depends more completely upon research to improve its processes and develop new products than the oil industry. The yearly research budget of the petroleum industry amounts to over \$100 million, approximately onefourth of the nation's total expenditure for industrial research, and 15,000 people are employed in its activities. The returns have more than justified the expenditure. The petroleum industry today is regarded as the most modern and progressive of all industries. Taking ful ladvantage of all new discoveries and technological

advances, the industry progresses so rapidly that a new refinery installation may be obsolete before it starts operating. The modern oil technologist has, in fact, transformed petroleum refining into a chemical industry and the modern refinery into a mass producer of some 2000 products.

With this background of dependence upon research, and its demonstrated eagerness to take advantage of all technological advances, it was inevitable that the petroleum industry play an increasingly important role in the rapidly developing chemical industry in this country. Today, the two are closely allied and the offspring of their union, petrochemicals, affects the lives of all of us.

# The Texas Gulf Coast

With these two great industries. oil and chemicals, as partners in the rapidly growing field of petrochemicals, the South is at long last performing a major role in industry. The concentration of petrochemical plants in the Southwest-more than 50 of which are located along the Texas-Louisiana Gulf Coast alone—is such as to warrant the designation of the petrochemical industry as a Southern industry. Over 85 per cent of the total petrochemical industry in this country is concentrated along the Gulf Coast in Texas within a radius of 200 miles from Houston.

The Lion Oil Company, whose proportionate investment in petrochemicals probably exceeds that of any other oil company, owns and operates an ammonia plant of 570 tons daily capacity at El Dora-

ELECTRIC GENERATORS IN THE 570 TON DAILY CAPACITY AMMONIA PLANT OF LION OIL



# Representative Southwestern Petrochemical Plants

Company	Plant Location	Investment
Carbide & Carbon	Texas City, Tex.	\$ 32 million
Carthage Hydrocol	Brownsville, Tex.	\$100 million
Celanese	Bishop, Tex.	\$ 25 million
Cities Service	Tallant, Okla.	\$ 2 million
Commercial Solvents	Sterlington, La.	\$ 22 million
Dow	Freeport & Velasco, Tex.	\$ 65 million
du Pont	Orange, LaPorte, &	4 00 million
	Victoria, Tex.	\$ 80 million
Esso	Baton Rouge, La.	\$ 30 million
Ethyl Corp.	Baton Rouge, La.	\$ 30 million
Jefferson Chemical	Port Neches, Tex.	\$ 22 million
Lion	El Dorado, Ark.	\$ 20 million
Mathieson	Lake Charles, La.	\$ 7 million
McCarthy	Winnie, Tex.	\$ 5 million
Monsanto	Texas City, Tex.	
Phillips	Pondon & Mountain Tour	\$ 25 million
Rohm & Haas	Borger & Houston, Tex.	\$ 25 million
Shell	Houston, Tex.	\$ 5 million
	Houston, Tex.	\$ 54 million
Spencer	Pittsburgh, Kans.	\$ 16 million

do, Arkansas. Other facilities include a sulfuric acid plant, nitric acid plants, an ammonium nitrate plant, a nitrogen solutions plant, and a sulfate of ammonia plant. Total plant investment is approximately \$20 million. The primary raw material is natural gas, which is also used as a source of heat and power.

The development of petrochemicals as a Southern industry is based largely on the abundant supplies of petroleum and natural gas available—over 50 per cent of our total oil production originating in Texas and Louisiana alone—and other factors include a good labor supply, accessible markets and political and popular support for the new industry. Technology, the great multiplier, is pointing the way to an even greater expansion of this industrial empire maturing in the Southland.

### Carthage Hydrocol

A unique petrochemical process is the Hydrocol or Fischer-Tropsch process for the synthesis of gasoline and other liquid fuels from natural gas. The Carthage Hydrocol plant now being completed at Brownsville, Texas, will make available a total of over 150 million pounds of various chemicals per year as by-products of the operation of the process.

This giant plant, built with great risk and courage, is an outpost on a new frontier. The plant wil cost an estimated \$100 milion and three companies will participate in its venture. Carthage

Hydrocol, the key unit, takes in a huge stream of gas and oxidizes it to form some 7000 barrels of gasoline and oil products per day. At the same time, over 300,000 pounds of crude mixed chemicals are produced and piped next door to Stanolind, who separates and refines the mixed stream into some 20 basic chemicals. These include most of the important organic acids, alcohols, aldehydes and ketones. The refined chemicals then are transferred to a unit of USI, which ships them elsewhere for further processing and marketing. It is a blueprint of things to come.

Nor are petrochemicals confined to the organic field alone. One of the most interesting developments has been the rapid growth of the synthetic ammonia industry from a prewar production of 400,000 tons per year from coal to a present production of 1,500,000 tons per year. Production of this basic inorganic chemical in the South now comprises 44 per cent of the nation's total production, and substantially all of the ammonia produced in the South is derived from natural gas.

A view of petrochemical developments in the South, and particularly along the Texas Gulf Coast, is, of course, only a very small part of the total picture. To treat the subject adequately would require volumes. A better appreciation of this vast petrochemical empire may be realized by considering the accompanying tabulation of some of the represen-

tative petrochemical plants in the Southwest.

This brief list covers only a portion of the companies actively engaged in petrochemical production in the South. The dependence of the industry upon a continuing adequate supply of petroleum and natural gas, both as raw materials and as sources of energy for industrial operations, cannot be over-emphasized. The deep South, and particularly the Golden Horn on the Gulf Coast, possesses no alternative fuel. Without natural gas, it would be an industrial desert.

Fortunately, proven gas reserves in the Southwest are equivalent to a 30 year supply at present rates of consumption, while proven oil reserves are sufficient to satisfy requirements for nearly the same length of time. Texas gas reserves are estimated to last for 50 years. And no one in the industry doubts that these reserves will be substantially increased by the incessant exploration and drilling operations in the South and Southwest. The new Gulf Field may increase petroleum reserves in this area manyfold.

While these figures are reassuring, industrialists are realizing that the continuing expansion of chemical industry in this area is largely dependent upon an assured supply of petroleum hydrocarbons. The transportation of this basic raw material and source of power to other sections of the country should be conducted in full recognition of the vital role it plays in Southern industrialization. Without adequate supplies of natural gas as a fuel and power source, as well as a basic chemical raw material, much of Southern industry would disappear overnight.

Governor McMath of Arkansas, at the recent dedication of the new Pan American coking plant at El Dorado, stated that one barrel of crude oil processed in the state contributes as much to the economy of the state as three barrels of crude shipped to other areas for processing. The same proportional loss of income results when natural gas is transported from the South to other areas.

The South is proud of its chem-

ical and industrial contribution to of Southern capital to invest in petrochemical industry. Its future contributions to the chemical economy of the nation will depend largely upon the breadth of vision of its industrialists, the willingness

the war effort, and of its powerful Southern industry, and the ability of the educational institutions in the area to keep pace with the growing need for technically trained personnel. In the last analysis, the ability of the South

to provide an aggressive research program may be the deciding factor for, as we have seen in this short survey of the rise of the petrochemical industry in the South, technology is the great multiplier.

# Southern Roots in The Plastics Tree By Raymond B. Seymour

The Atlas Mineral Products Company Mertstown, Pennsylvania

IF one were to accept some of the plastics advertisements literally, he would conclude that all plastics were manufactured directly from coal, oil, salt, sand, air and water. There is no dearth of these source materials in the South but the major routes from the basic materials to the finished products are circuitous.

Vinyl, phenolic, styrene and urea plastics accounted for about 80 per cent and materials derived from cellulose represented about 10 per cent of the total plastics sales last year. Plastics sales increased fifteen times in the past years and five times in the past decade. There is every indication that this healthy growth will continue and it is estimated that the plastics sales will double in the next five years and be three times its present volume in 1960.

A more complete review of the raw material requirements will show conclusively that the basic ingredients for 90 per cent of the entire plastics industry are available in the South. The South produces over 70 per cent of the country's petroleum and almost 50 per cent of its coal. The South is certainly not deficient in transportation facilities since the total railroad mileage and carloadings are in accord with the regions, area and population. The South also has an ample supply of native intelligent labor and adequate power, fuel and water.

# Finished Products

Southern factories produce less than 20 per cent of the total finished products manufactured in the entire country. However, in spite of this deficiency, Southern

chemical manufacture is in proportion to the population. Texas. Tennessee, Virginia and West Virginia alone manufacture almost 20 per cent of the country's chemicals

The South is also a major factor in the paint industry with large plants in Kentucky and Maryland producing over 50 per cent of the area's paint. However, in spite of an abundance of raw materials and ample supply of most of the intermediates, the South has less than 10 per cent of the country's plastics manufacturing plants. The South, of course, is not adjacent to the major plastics consumer markets but this deficiency should be outweighed by the previously listed assets. Even today the present consumption of plastics in the South far exceeds the output in Southern plants. The potential Southern plastics markets are almost unlimited.

### Technical Manpower

The South's shortcomings in technical manpower as demonstrated by too few patents and technical publications and their affect on chemical manufacture is

well known. The significance of these deficiencies to plastics opportunities is more readily recognized when one learns that large plastics users require considerable technical service from plastics manufacturers. Fortunately, the South is building up a background of technical knowledge in the plastics field which will be useful to both manufacturers and consumers.

### Research

Being a multi-million dollar industry, plastics manufacture is still in its adolescence. A section that is blessed with such an abundance of raw materials and intermediates should not overlook the challenge offered by an industry which will treble in the next decade. In recent years, several large plastics manufacturing plants have been established in the South and there is every reason to believe that the larger plastics firms will continue to invest in Southern manufacturing facilities.

Unlike minerals, agricultural products and foods, plastics are almost completely dependent on modern research and education. One may question the soundness of investing in research and education in order to exploit coal mines, raise tobacco or weave cotton

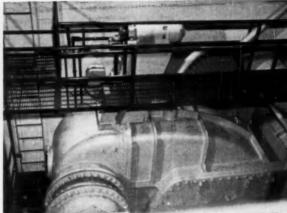
(Continued on page 136)

# Plastics Sales for 1949\*

Type of Plastic	Millions Lb Sold
Polyvinyl chloride	360
Phenolics	232
Polystyrene	203
Urea and melamine	112
Cellulose acetate	76
Other cellulosics	15
Acrylics, alkyds, cumarones, petroleum resins, polythylene, nylon and silicones	191

\*Protective coatings and fibre sales not included.





The view at left shows the lower valve, and at right the upper valve is shown with guard cover removed to show gears on motor and valve stem. Upper and lower valves work in synchronization to reverse flow of water through condenser. Each side may be operated independently.

# Reversing Valves Improve Surface Condenser Performance

Installation of reverse flow "self-cleaning" condenser reduces down time in Georgia plant.

By R. S. Causey

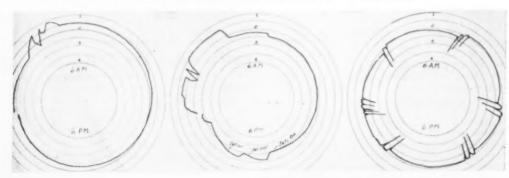
Superintendent of Plant Atkinson Georgia Power Company

PLANT Atkinson has four condensing steam turbines, each driving a 60,000 kw generator to produce a large portion of the electrical power required in the State of Georgia. All of the units obtain their condenser cooling water in succession from the same intake tunnel which brings river water culty in keeping

into the plant through revolving screens that remove the larger sticks and trash.

As each new unit was added after the original one, it was found that the trash and dirt always collected at the dead end of the tunnel and caused considerable difficulty in keeping the last condenser clean, while those upstream gave little trouble. Even with frequent cleaning of the condenser, it was extremely difficult to hold a reasonably low back pressure on the turbine, especially during the summer when the river was hot and high loads were carried on the turbine.

THE CHART AT LEFT SHOWS HOW BACK PRESSURE INCREASED IN DAILY OPERATION, REQUIRING DAILY CONDENSER CLEANING. THE CENTER CHART SHOWS HOW IT WAS NECESSARY TO USE AUXILIARY JETS TO MAINTAIN VACUUM DURING PEAK LOADS, RIGHTHAND CHART SHOWS RESULTS AFTER VALVES WERE PLACED IN OPERATION.



In 1948 when No. 4 unit was installed, it was decided to include reversing valves on the condenser in hope of reducing maintenance costs and improving efficiency. These valves have proven to be even more beneficial than was anticipated, and in the short time they have been in use they have already paid for themselves many times over.

This unit, as installed, is a C. H. Wheeler Mfg. Co. two-pass, divided water box surface condenser, designed to condense 405,000 pounds of steam per hour when supplied with 59,000 gallons of circulating water per minute at 80 F. It will produce an absolute pressure of 2.00 inches of mercury when operating under the above conditions with the tubes 85% clean. The condenser has 8180 one-inch O.D. tubes providing 45,000 square feet of condensing surface.

The condenser is provided with four C. H. Wheeler-patented motorized, reversing, sluice valves, one on each intake side, and one on each discharge side of the condenser (see drawing). As shown by

the drawing and its accompanying explanation, valves may be placed in "reverse" position, thus allowing the cooling water to circulate through the condenser in a direction opposite to the normal flow.

The unit was operated for several months after its completion before the reversing valves were placed in service. Because of this fact, a good comparison of the operation of the machine before and after can be obtained. As shown on accompanying charts, before installing reversing valves the back pressure would build up rather rapidly all day, and it became necessary to reduce the load during the night, and clean the condenser almost every day. Quite often, during periods of sustained peak loads, it was necessary to put in service the auxiliary jet on the air ejector to keep sufficient vacuum on the condenser and prevent the turbine from tripping out.

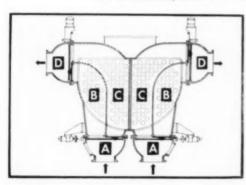
The charts also show very clearly the excellent results obtained after the reversing valves were put in service. The usual practice at this plant now is to reverse the

flow through the condenser for approximately fifteen minutes on each side during every eight-hour shift, unless some unusual circumstance requires that it be done more often. This reversing procedure can be carried out under full load conditions.

The results have been exceedingly good. The back pressure on the turbine has been maintained at a comparatively constant and satisfactory value. This in turn has, of course, increased the efficiency of the unit. Maintenance costs have been lowered materially, since it has been necessary to clean the condenser on the average of less than once a month instead of every day as required before the reversing valves were installed. This, of course, increases the available output of the generator tremendously, by eliminating the necessity for dropping down to only about half load for several hours every day to clean the condenser.

It is thus quite apparent that this seemingly small addition to the plant has produced results far in excess of its initial added cost.

VIEW OF CONDENSER, SHOWING LOCATION OF VALVES AND OPERATING MECHANISMS.

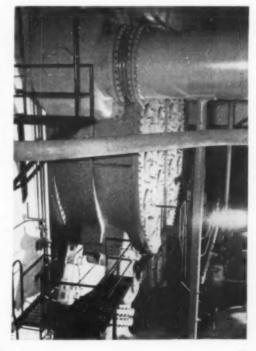


Here's How the "REVERSE FLOW" Principle
Works

Both halves of this Dual Bank Condenser work the same, but independently of each other.

Left side: Water enters divided water box at valve chamber A, with left port open. It flows through pass B to end of condenser, back through pass C and out through upper port of D.

Right side: Flow is reversed: Valves at inlet A and discharge D are changed to permit wear to flow through C and back through B in the opposite direction, then out through lower port of D.



# A.I.S.I. Birmingham Meeting

Several recent notable contributions by iron and steel plants in the South to the development of the industry were described by executives and metallurgists at the October Birmingham Regional Technical Meeting of American Iron and Steel Institutes

In a paper on "The History of Pig Iron Manufacture in Alabama," BRADFORD C. COLCORD, President of Woodward Iron Company, Woodward, Alabama, told how the blast furnaces of Alabama have passed through several cycles of development to arrive at a period of sound financing and merchandising, with practically all of their foundry iron now used in Southern foundries.

Many difficulties and experiments in producing pig iron from low grade ore that had been extensively treated before being charged into a blast furnace, were described by L. A. MILLER, Vice President of Tennessee Products & Chemical Corporation, Nashville, Tennessee, in a paper titled "The Manufacture of Low Phosphorus Pig Iron from Sintered Pyrrhotite Residues."

"The Manufacture of Electric Weld Transmission Pipe" for use in transportation of natural gas was described by J. H. MIDDLETON, Chief

Metallurgist, Gulfsteel Division, Republic Steel Corporation. This company built a mill at Gadsden, Alabama, in 1948, to manufacture electric weld pipe of 20 to 30 inches diameter.

The Design of a New Open Hearth Shop was described by H. E. WAR-REN, JR., Division Superintendent, Open Hearth Department, Homestead District Works, Carnegle-Illinois Steel Corporation.

R. H. Ledbetter, Manager, Department of Metallurgy, Tennessee Coal, Iron and Railroad Company, presided at the afternoon session at which the technical papers were read. Hugh Morrow, Chairman Sloss-Sheffield Steel & Iron Company, presided at the evening dinner at which the historical paper was read.

# Reynolds Metals—Arkansas

Aerial view of Reynolds Metals Hurricane Creek, Arkansas, Alumina plant. A yearly capacity of 1.555.000,000 lb of alumina makes this the largest plant of its type in the world.

Pure alumina (aluminum oxide) is extracted from raw bauxite ore by an extended series of chemical treatments and processes in this Arkansas plant.

Alumina is the material from which metallic aluminum is produced by the  $H\epsilon ll$  electrolytic reduction process.

Since this plant with its yearly capacity of 1,-555,000,000 lb of alumina is the largest of its type in the world, much interest has been evinced as to its production facilities. Copies of a new booklet describing the Hurricane Creek Plant are available without charge upon request to Reynolds Metals Company, 2000 South Ninth St., Louisville 1, Ky.



# Power and Mechanical Engineering

Grand Central Palace New York City Nov. 27 — Dec. 2 More than 300 exhibits occupy the entire exhibition space of the Palace. Many displays consist of complete apparatus. and others demonstrate newly developed components of well known equipment. Working models are employed extensively to simulate actual plant performance.

THE Exposition is being held under the auspices of the American Society of Mechanical Engineers, coincident with the annual meeting of the Society, which is strongly committed to progress in engineering through standardization of improved materials and codes of safe practice.

Of greatest interest to business executives, industrialists and engineers who make up the principal audience, will be equipment which directly reflects the forward trend in generating plants, much of which is specified for units now under construction or presently planned by the great power-consuming industries and forward-ooking public utilities. Equally important in the

view of many visitors is the application of much of the equipment on display to existing plants. In many instances, modifications now possible for the first time will raise efficiencies to levels that were literally out of sight only a few years ago.

Economic pressures are forcing business administrations to demand a better return on the invesment in power, and engineers who are called upon to meet the challenge are finding the answer in various steps which, taken together, spell out a complete revision of the general method of converting fuel-energy into work. This starts with the coal, oil and gas under ground and ends with the application of heat, light and power in all manner of industrial operations.

VEW equipment for power production and mechanical processing reflects the thinking in engineering circles over the past few years which, in simplest terms, spells out the objective of getting more heat out of the fuel and more work out of the heat. Technically this requires that the difference between the lowest and the highest temperatures in power plant or heat process be increased. Generally speaking, the greater temperature difference is most readily attained by going higher on the scale. The result is that today combustion is being effected and steam is being generated commercially at temperatures that formerly were impossible of attainment for lack of materials that would withstand high heat and extreme pressures.

## Advances Shown

Advanced standards of design are reflected in exhibits at the Power Show notably in improved methods and equipment for treat-

ing fuel before it enters the combustion chamber providing a wider latitude in the selection of fuel, for one thing, a hotter fire and improved extraction of the heat, for another. Exhibits showing advances in this field include grates, fire-boxes of new design, and refractories of improved durability. There are also more efficient power oil burners, blowers, draft equipment, smoke prevention equipment which not only allays a nuisance but improves efficiency by reinjecting into the fire the unconsumed hydrocarbon particles which darken the products of poor combustion. Several such appliances attack the problem of fly-ash in waste gases which creates the dust evil in industrial communities.

Higher standards of design are reflected more broadly by the exhibition of engineering materials in the raw, in fabricated forms and in finished products that meet the most exacting requirements of resistance to pressures and temperatures far beyond the demands of the past. Many such are produced by methods that have come into commercial use within only a very few years.

A most important group of copper-base alloys used in condenser tube applications is composed of the "inhibited Admiralties," an outstanding application of which is found in condenser tubes. An example to be seen at the Palace is a demonstration condenser of the shell and tube type in which phosphorized Admiralty tubes are used which are extruded from continuously-cast billets. This exhibit is designed to demonstrate visually some important characteristics of fluid flow in heat exchangers of this pattern, and is distinctly educational in its nature.

Numerous displays have been developed especially for educational purposes. One such, broadly covering the need for higher standards in the design of heat exchangers, has been staged by the Tubular Exchanger Manufacturers Association. At another booth a typical pressure-loss testing hookup, counterpart of laboratory equipment used in valve design will be seen. This equipment demonstrates comparative flow characteristics using half-section models of conventional and streamlined valve bodies, emphasizing the superior opening action and lower pressure-drop of newly developed piston type check and stop-check designs.

Also educational in purpose is the display of one of the great oil companies, featuring a model hydrostatic bearing and also a lucite model sleeve bearing to demonstrate pressures developed by the rotation of the journal. Another visual demonstration at the same booth is a plastic model turbine of a lubricating system revealing some spectacular developments in this important problem.

Also educational in intent is a display demonstrating how vibration control works, showing mountings for all industrial requirements, illustrating typical rubber-bonded parts so designed as to simplify assembly as well as improving product performance.

Stainless steel assemblies for jet aircraft and flexible highpressure pipeline expansion joints capable of withstanding pressures up to 1500 psi are featured in a display of stainless steel bellows and flexible hose.

New material of an entirely different class is that represented by bearings, bars and finished machine parts fabricated from metal powders of copper, bronze, iron, copper-iron, stainless steel, nickel silver and aluminum. Heavy duty porous metal bearings, because of their self-lubricating properties, will provide a continuous oil film and once installed in a machine may never require subsequent lubrication.

# Push-Button Controls

Heat extraction from fuel and heat exchanges in the power plant have generated an extensive line of equipment in the way of instruments and controls, in which remarkable advances have been made within the short time that has elapsed since the previous Power Show. Great strides have been made in the production of individual instruments for indicating and recording temperatures, pressures, liquid levels, rates of flow, weights and measures and chemical analyses, these serving many other fact-finding purposes in and around the power-generating station.

Most spectacular advances in this field are those involving remote indication and control, several of which have placed process control, and even the operation of an entire power plant literally under finger-tip control. Going even beyond the push-button control, one "integrated load-frequency combustion control" for the first time applies changes in electrical load directly to boiler regulation. Under this system, when the load on a power plant changes, a corresponding change is initiated in the combustion control equipment without waiting for a change in steam pressure to occur. This direct hook-up between the electrical and the combustion controls speeds up the response of boiler firing to variations in load demand.

Another exhibit having a first view at the Palace is an electronic master control system which was developed to solve the transmission problems created by control centralization in large plants. This system offers improved accuracy, speed of response, installation flexibility and smaller, simplified control panels with fewer moving parts.

With the growing interest in smoke abatement and fuel conservation, one exhibitor offers to consumers whose plants burn hydro-carbon fuels in suspension, the comforting assurance that control systems are available for operating at high efficiency without the hazard of smoke formation. The means to that end is a roboteye that automatically holds the air-fuel ratio at a point where a thin haze, invisible to the human eye, is generated in the breeching beyond the fire box.

Illustrating a different phase of the instrument field is an exhibit featuring a pH Recorder in package form, having all components housed in the recorder case, dissolved oxygen-hydrogen recorders, single and multi-point recorders for analyses of CO<sub>n</sub>, H<sub>n</sub>, CO, CH, and O<sub>r</sub> in flue gases. These instruments are of direct value in determining combustion efficiency and in observing rates of corrosion. They are of interest to operators in oil, sugar, linoleum, sewage disposal, cement, paper and pulp and distilleries, as well as power plants.

# Equipment Varied

How varied is the equipment that finds use in the modern power plant is difficult to appreciate until the roster of the Exposition is reviewed. A new hydrostatic testing pump is capable of building up a pressure of 25,000 psig, while a new "miniPump" which will handle clear liquids at the rate of a few cc per hour against pressures up to 100 psig is designed for the chemical treatment of boiler water, industrial water, municipal water and waste.

A manufacturer of springloaded safety and relief valves has come along with a bellows construction designed to form a flexible curtain to isolate guiding surfaces, springs and spring chambers from corrosive liquids and gases. The latest advances in high pressure, high temperature cast steel valves for steam service shown by another manufacturer, are sealed by internal pressure, therefore stay tight under all operating conditions. The heavy body-bonnet flanges, bolts and nuts of conventional valves are eliminated, the streamlined contour simplifies application and reduces cost of insulation. These valves have welded ends and are available in all commercial sizes in classes from 600 lb to 2500 lb inclusive and higher. Small sized integral bonnet steel valves for such services as high-pressure steam, feedwater, by-pass, instrument and throttling are available in classes of 1500 and 2500 pounds and in 12" to 2" sizes.

The scope of the Exposition includes a wide range of auxiliary equipment suitable for all manner of industrial plants as well as generating stations. These are steam and Diesel engines, packaged boilers showing remarkable efficiencies considering their relatively small size, power transmissions, conveyor systems, material handling equipment in considerable variety.

The array of electrical apparatus to be seen at the Palace is exceedingly comprehensive and includes on the power side, exclusive of signal systems and controls, a comprehensive assortment of direct drives, variable speed drives applicable to mechanical equipment to synchronous motors. One exhibitor specializes in standby electrical generating plants for factories, hotels, airports, radio stations and public buildings.

Several innovations in mechanical design are to be found on the exhibition floors of the Palace,

serving different purposes and applicable in a variety of ways. One of the most remarkable of these is a magnetic clutch which is electrically controlled and shows no wear on the torque transmitting surfaces, Because the construction and operating characteristics of this device are different from those of any other clutch, its possible applications are varied and thought to hold high promise for the future.

Its applications, principally in machine-tool service, include five different applications: In slip service as a speed reducer, for reversing duty, for on-off duty, for braking and for torque-limit drives—as in tapping, drilling, and

nut-running applications. A line of magnetic amplifiers and a line of photo-electric cells form a part of the exhibit in which the new clutch is featured.

The Exposition opens Monday, Nov. 27, at 2 p. m. and the hours daily are from 11 a. m. to 10 p. m. except Wednesday and Saturday when the closing time is 6 p. m. Admission is by invitation and registration only and is limited to executives, technical and operating men interested in power plant and allied equipment.

The Exposition is under the management of the International Exposition Company. Charles F. Roth is manager and E. K. Stevens, associate manager.

# MANUFACTURERS EXHIBITING AT THE POWER SHOW

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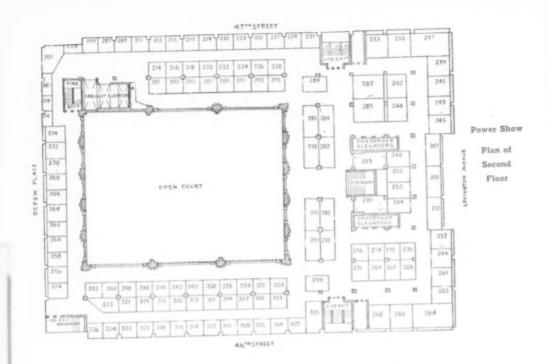
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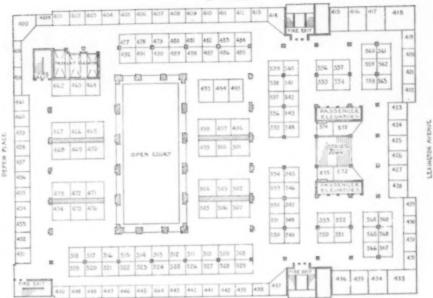
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1 Exchange Pl., Jersey City 2, N. J.	440 & 521	2240 Diversey Parkway, Chicago 47, III. Republic Steel Corporation, Steel and Tubes Division	1
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Power 330 W, 42nd St. New York 18 N V		Clifton, N. J.	385-387
		Discover, Company	
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# Requires Less Maintenance

GENERAL ELECTRIC
IRS INDUCTION VOLTAGE REGULATOR

- \* No contacts in the main circuit.
- \* No cams or springs or elaborate gear trains.
- ★ No mechanical brake to adjust, no separate braking circuit.
- ★ Even the oil lasts longer—because the tank is sealed to stop all breathing.

General Electric IRS induction voltage regulators give accurate, stepless regulation—with no time-delay. They respond immediately and will correct the voltage at an average rate of 1 per cent in  $1\frac{1}{2}$  seconds throughout the entire range of  $\pm 10\%$  regulation.

And—no other regulator can match them in low maintenance costs. Ask for Bulletin GEA-2985.

Apparatus Dept., General Electric Company, Schenectady 5, New York.



Sturdy bearings all under oil.

GENERAL



ELECTRIC



Readers are invited to send in kinks, ideas, and suggestions. Payment is made for all material accepted.

# **Drill Press Adaptor**

A DRILL press adaptor, to replace the sleeve adaptor commonly used on high-speed drill presses, has been developed at The Glenn L. Martin Company by Anthony J. Rose, Jr.

This adaptor was originally developed because of the difficulty of keeping sufficient high-speed drills in stock. The new adaptor makes possible the use of drills right down to the shank, avoiding the necessity of frequent replacements, and requiring only the regrinding of drills.

In the new adaptor, the air tube enters from the rear of the adaptor, spirals at the base, and returns to the rear, throwing the chips out in that direction, avoiding the hazard to eyes of chips spiralling in all directions from the drill.

# Easily Changed

One of the most important factors in the new adaptor is that it can be changed easily. With the sleeve adaptor, it was necessary to remove the adaptor completely in order to insert a new drill, and then the sleeve had to be replaced. Under the new method, the drill can be changed without removing the adaptor.

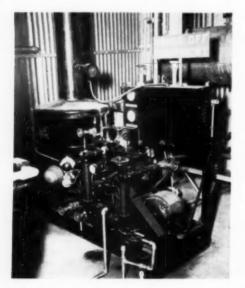
The fact that the new adaptor leaves the drill and chuck exposed makes possible the use of a Plexiglas shield through which the operator has a clear and unobstructed view of the operation.

Because of the greater weight of the new adaptor, it is easier to pull the arm into position, lessening fatigue for the operator.

Chips do not accumulate inside

the adaptor to clog the drill as they do when the sleeve adaptor is used, since the new adaptor leaves the chuck and drill exposed.



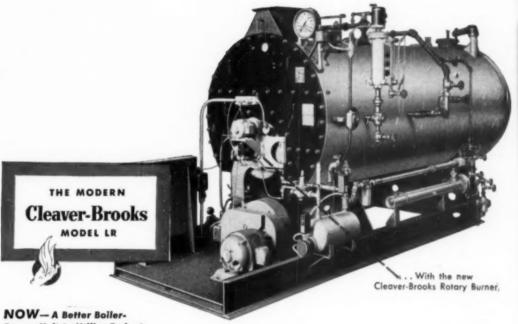


# Steam Supplied by Forced Circulation Unit

THE photograph shows the 15 hp oil-fired Clayton Manufacturing Co. steam generator at the Wynn Oil Company plant. This single 15 hp unit provides all of the steam necessary for building heating and oil processing use in the plant. Any desired amount of steam can be obtained by merely adding single Clayton units, which can be operated in tandem.

Steam from the generator is used through a Hydro (Clayton) cleaner for barrel cleaning. Using steam in this manner has cut costs of this particular operation to only a few cents per barrel. Steam for the heaters on the assembly line and heat for the offices is also furnished by the same Clayton generator.

# FOR PRODUCING STEAM



**Burner Unit to Utilize Today's** Low-Cost Fuels — Heavy Oil and Gas

The Cleaver-Brooks Model LR is a "trailblazer" in modern self-contained boiler design and construction. It makes more effective use of today's low-cost fuels, (heavy oils and gas), and you are assured of better boiler performance.

# A Brief List of Notable Features:

- the new Cleaver-Brooks rotary burner simple — compact — precision ma-chined — perfect mechanical balance — fully automatic — provides unprecedent-ed flexibility in burning heavy fuel oils or industrial gases.

single low-speed, low-power consumption blower furnishes both primary and secondary air for combustion—less weight

and space requirements - reduction in sound levels.

- totally enclosed, drip and dust-proof panel for all major electrical controls. -electronic combustion safety devices.

dual low water cutoffs - are standard equipment. - simplified design of combination gas-

oil burner permits change-over from oil to gas or vice versa in less than a minute. improved design of boiler furnace and liberal heating surfaces provide greatest economy with all fuels.

- hoilers of all-welded construction - meet standards of A.S.M.E. boiler code and leading underwriters - burner ap-

proved by recognized national agencies,

The Cleaver-Brooks Model LR selfcontained boilers are of a highly devel-oped four-pass fire tube design — tested and proved by factory and field experience on several thousand boilers of this type,

Write for complete specifications, dimension data, firing rates.

CLEAVER-BROOKS COMPANY 365 EAST KEEFE AVENUE

MILWAUKEE 12, WISCONSIN New Ready: Bullstin SG 142 contains detailed date and description of the MODEL LR. Send for

your copy today!



# Carbide Dies Cut Press Down Time

THE John E. Mitchell Company of Dallas, Texas, is one of the country's largest producers of cotton cleaning machines. Use of Carboloy dies for both blanking and forming has not only virtually eliminated all costly former press down time for die changes during peak production but has also increased overall die life some 65 times.

Carbide dies are used for producing channel-shaped "sawbands". Stock is .030" thick cold rolled C-1040 strip steel, purchased in rolls. Stock feeds into one end of the automatic sawband machine in a horizontal position from the reel.

The oval hole in the channel saw is punched first. Blanking die then punches the teeth and the forming die gives the section of steel band its final channel shape. Round hole is then punched and the saw band is cut off to length.

Steel blanking dies had to be sharpened at least once a day during Mitchell's "busy season" from March through August. The car-

CHANNEL-SHAPED "SAW-BAND" USED ON COTTON CLEANING MACHINES AS PRODUCED AT THE JOHN E. MITCHELL COMPANY, DALLAS, TEXAS.

bide blanking die performed 20,-000,000 blanking operations—a normal full year's operation—before it had to be sharpened.

More than 30 hours of maintenance time per machine are being eliminated since down time was at least 15 minutes per die change.



# **Planned Movement of Materials**

THE management of Tube Turns, Inc., Louisville, Ky., has a keep-everlastingly-at-it program of improving its operation. During the past year this has led to the development of material handling and storage procedures that have been nationally publicized.

The acquisition, movement and storage of materials, which includes piping in many sizes, metals and alloys, as well as plate and bar stock, is chiefly regulated by long term forecasts and economic conditions. The procedures employed are carefully planned, flexible and efficient, and the end result is better service for distributors and their customers.

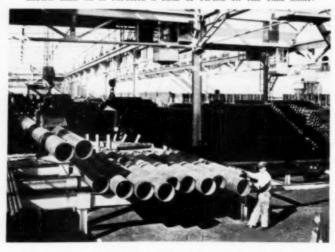
The primary handling tools in the yard are four traveling cab type bridge cranes of 5 tons each. Two are on adjacent north and south runways. One traverses an area 330 ft in length, and the other operates over an area 190 ft in length. Two unloading cranes, one at each end of the layout, operate from east to west, and extend over the double track rail

siding that parallels the yard. Some unloading and stacking chores are shared by a 5-ton tire mounted mobile crane equipped with, an adjustable 30 ft boom. It deposits material in 10 ton, rubber tired trailers, which are

hauled by in-plant trucks. All cranes are equipped with magnets for safe, fast lifting.

Implementing the cranes is a 100 ft ramp of 10 in. and 12 in. I-beams, along which pipe can be rolled to specific storage areas, and other facilities that permit incoming shipments of material to be moved in any quantity or direction called for by the plant's schedules.

ONE OF TUBE TURNS' FOUR TRAVELING CAB-TYPE BRIDGE CRANES IS SHOWN HERE AS IT DEPOSITS A LOAD OF PIPING ON THE YARD RAMP.



# HOTTER, SCONER steam traps... knock cold spots out of platens



# **Modern Pickling Installation**

PICKLING is the process of removing rust and scale from metal by passing the materials through an acid bath, then through a rinse tank, and finally through an alkaline bath in the neutralizing tank. Originally wood tanks were used exclusively, but with the advent of acid and alkali proof cements, masonry construction be-

THE INITIAL COST OF SUCH CON-STRUCTION IS SOMEWHAT ABOVE C ON VENTIONAL CONSTRUCTION. HOWEVER, FOR STURDINESS, LONG LIFE, LOW MAINTENANCE, AND PRE-VENTION OF LOSS OF PRODUCTION BY SHUTDOWN TIME, IT IS BY FAR THE MOST ECONOMICAL.

came feasible and Nukem Products Corporation pioneered this development. A recent pickling tank installation provided for a forward looking Southern steel mill is a good example of recent advances and improvements.

For this installation welded steel shells were selected. The steel interior of the tanks then received a leak proof impervious membrane of modified polyethylene resins applied and fused by flame spraying.

Following the membrane, an acid and alkali proof monolithic brick sheathing was installed. This special brick is manufactured by the desired method. Monolithic construction provides maximum

wall strength with all joints broken and staggered, yet requires less jointing compound and provides the safest and most economical construction for high temperature pickling.

The sidewalls were laid up with 4-in. course of 8-in. x 4½ x 3¾ Acid Brick, jointed and backed with ¼-in. Plasul BASOLIT, a hot poured plasticized sulphur base cement, followed by a 5-in. thickness of Monolithic Brick, jointed by NUKEM All-Purpose Resinous Cement, a chemical setting synthetic resinous Cement, immune to acids and alkalis. For expansion purposes, rubber expansion joints,

were interspaced at regular intervals throughout the tanks.

The exterior of the steel tanks were given a protective coating of Nukemite, an acid and alkali resistant paint, a co-polymer of vinyl resins. This coating protects the outer steel shell against corrosion caused by fumes or spillage of acid.

The tanks themselves were set on acid proof brick piers and the entire working floor area in the pickling section covered with a Nukem Acid Brick Floor.

This floor was laid over concrete, to which Concrete Primer was applied, to close and seal the pores of the concrete. This application was followed by an impervious membrane of NU-MASTIC, a specially compounded petroleum base material. This was followed by acid proof brick jointed with Resinous Cement.

# Foundry Saves 1½ Hours in Cut-off Operations

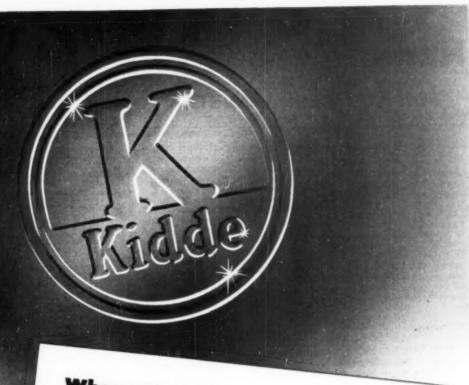
STEEL foundry in Florida casting heavy gears was using chipping hammers to cut off 4-in. gates from their steel castings. Time consumed was approximately 2 hours per gate and it was necessary to transfer the piece to a swing grinder for clean-up. A new and improved technique has reduced the cut-off time to 1/2 hour. A Cleco 1480 Edge Grinder, manufactured by the Cleco Division of Reed Roller Bit Company, Houston, Texas, operating at 8,000 rpm and using a 7" x 1/8" cotton-bonded wheel incorporating aluminum oxide as the abrasive, is now used on this cut-off job.

The technique permits the operator to get close to the body of the casting, removing practically all surface material in the cut-off operation. A penetration cut is made approximately 2-in, deep on all sides of the gate removing it completely from the body of the casting. Clean-up is accomplished with the same portable tool without the necessity of transferring the piece to a swing grinder for a snagging operation.

The same technique has been applied in grey iron foundries for notching gates and risers approximately <sup>1</sup>4-in. to <sup>1</sup>2-in. deep after which the gate can be removed with a sledge. Again, clean-up is accomplished with the same tool.

THE OPERATOR OF THIS FLORIDA FOUNDRY IS CURRENTLY SAVING AP-PROXIMATELY \$9 PER CASTING UTI-LIZING THIS CLECO EDGE GRINDER.





# When you've got a problem in fire prevention...

REMEMBER that Kidde installed the first approved high pressure carbon dioxide system for generators

REMEMBER that Kidde installed the first approved high pressure carbon dioxide system for transformers

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Our engineers will be glad to give you their advice based on experience with over 500 power plants protected with Kidde carbon dioxide equipment.

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# **NEWS**

# FOR SOUTHERN INDUSTRY

### Atlantic Steel Promotions

R. H. WRIGHT has been named General Superintendent of the AT-LANTIC STEEL COMPANY, Atlanta, Georgia, according to J. H. Girdler, Vice President.

R. E. Bobbitt has also been named Superintendent of Maintenance and W. R. Potts, Chief Engineer.

Mr. Wright, a graduate of Georgia Tech, has been connected with the Atlantic Steel Company since 1936 in both sales and operating capacities. He has served as assistant superintendent of the wire mills since 1948.

### Stone & Webster-Houston

STONE & WEBSTER ENGINEERING CORPORATION has recently announced the appointment of Robert Jefferson Carter as Southwestern District Manager for the Corporation with offices in the Esperson Building, Houston, Texas.

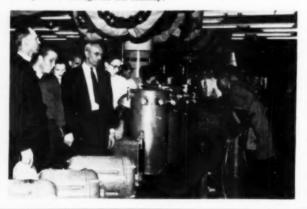
Mr. Carter, who succeeds Mr. A. T. Krook recently elected President of Stone & Webster Canada Limited after nine years as Manager of the Houston office, is a graduate of Washington University of St. Louis where he received his engineering degree in the class of 1924. After fifteen years of engineering experience in the petroleum industry, he joined the Stone & Webster organization late in 1939 and since then has been associated with some of their most important projects in the petroleum field. Since February, 1948, he has been Assistant Chief Process Engineer of the Engineering Corpo-

# Wagner Electric Has Open House

The Wagner Electric Corporation conducted a successful plant visit on October 14th and 15th at their main plant in St. Louis, Missouri. More than 15,000 people toured the entire plant.

General purpose of the event was to acquaint all guests with the large number of electrical and automotive products that Wagner manufactures and sells and to show their modern production equipment.

In addition to their main office and factory in St. Louis, Wagner has two other plants in Illinois and conveniently located branches in 31 key cities throughout the country.



# FUTURE EVENTS Of Engineering Interest

AMERICAN SOCIETY OF MECHAN-ICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th 8t., New York, N.Y. Mov. 36-Dec. 1, Annual Meeting, Hotel Statler, New York, N. Y.

AMERICAN SOCIETY OF REFRIG-ERATING ENGINEERS, M. C. Turpin, Sec'y, 40 West 40th St., New York 18, N. Y. Dec. 3-6, Annual Convention, Hotel Commodore, New York, N. Y.

INTERNATIONAL INDUSTRIAL EXPOSITION, Ed G. Lenzner, Gen. Mgr., 41 San Jacinto St., Houston 2. Texas.

March 11-17, Coliseum, Houston,

AMERICAN SOCIETY OF MECHAN-ICAN ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York,

April 2-5, Spring Meeting, Hotel Atlanta-Biltmore, Atlanta, Ga.

AMERICAN SOCIETY OF MECHAN-ICAL ENGINEERS, C. E. Davies, Sec'y. 29 West 39th St., New York, N. Y. April 17-19, Process Industries Conference, Baltimore, Md.

SATIONAL MATERIALS HANDL-ING EXPOSITION, Clapp & Polak, Inc., New York, N. T. April 30-May 4, Fourth Annual Exposition, International Amphatheatre, Chicago, Ill.

### Tristate Acquires Monumental— Baltimore

The Tristate Electrical Supply Company, Hagerstown, Md., has recently taken over The Monumental Electrical Supply Company, one of Baltimore's oldest electrical whole-salers. The business of the combined companies, headed by Robert A. Stott, will be operated at a new warehouse at Loch Raven Road and 28th St., Baltimore, Md.

ROBERT L. MCCALLEY and HERBERT McCALLEY, who formerly operated Monumental, will be associated with Tristate, as will other departmental heads of Monumental.

# Eagle Signal Appoints Combs Company in Southeast

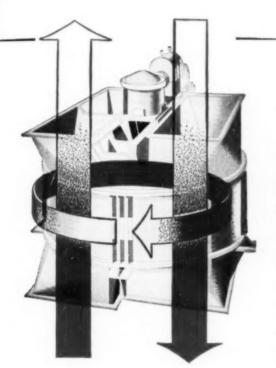
The EAGLE SIGNAL CORPORATION, Moline, Illinois, manufacturers of a complete line of timing and counting devices for industrial and process controls, has appointed the Thomas B. Combs Company, 505 Bona Allen Bldg., Atlanta, Georgia, as a direct factory representative for Georgia, North Carolina and South Carolina.

The establishment of the Atlanta factory representative, supplements other representation in Baltimore, Birmingham, Houston, and Jacksonville, Florida.

# Increase the efficiency of your present boiler

# with the Ljungstrom AIR PREHEATER





The installation of a Ljungstrom air preheater on your present boiler offers the opportunity for considerable fuel savings that will more than offset the initial cost of the preheater in a matter of a few years.

The regenerative counterflow principle of the Ljungstrom permits operation at lower exit gas temperatures... assuring increased heat recovery and reducing the amount of fuel required. Moreover, the compactness and lightness of the preheater makes it possible to install it on your present boiler with minimum change in the existing structure.

For more information as to how you can approach modern performance standards with a boiler that is operating without an air preheater, or with out-of-date air preheater, write to the Air Preheater Corporation. Our engineers will welcome the opportunity to show you how the Ljungstrom can raise the over-all efficiency of your plant.

The Ljungstrom operates on the continuous regenerative counterflow principle. The heat transfer surfaces in the rotor act as heat accumulators. As the rotor revolves the heat is transferred from the waste gases to the incoming cold air.

# THE AIR PREHEATER CORPORATION

60 EAST 42nd ST. . NEW YORK 17, NEW YORK

# Corrosion Testing Station— North Carolina

Representatives of more than 100 industrial companies and government officials were invited to attend the formal opening on November 15 and 16 of the new Harbor Island addition to the Kure Beach corrosion testing project near Wilmington, N. C., it was announced by F. L. La-Que, in charge of the corrosion engineering section of The International Nickel Company, Inc., under

whose direction the project is op-

With the new laboratory and marine exposure racks which have been added at Harbor Island, the Kure Beach project now has increased facilities for the study of over 20,000 specimens of all types of materials in sea water and sea air. It is believed to be one of the largest projects of its type in the world.

The sea water tests were originally located at Kure Beach, where they

were first established in 1935. They were moved this year to the new station at Harbor Island, about 20 miles north. The atmospheric testing lot, covering over an acre of ground, is located at Kure Beach, as is a station about 80 feet from the shoreline for testing the effects of sea water spray.

Among the more than 20,000 specimens under test are specimens of metals, alloys, non-metallic materials and protective coatings—including paint—and even rope.

A distinguishing feature of the entire project is the manner in which manufacturers of sometimes competitive products have united on their common enemy—corrosion. Information and data on means of fighting this enemy, which annually exacts a toll of hundreds of millions of dollars from industry, are freely exchanged.

# PIEDMONT PRODUCTS COMPANY FOR REFRACTORY SERVICE

ALL WORK GUARANTEED
Unexcelled workmanship backed by wide experience



LEFT: Refractory setting for integral-furnace type boiler.



# SERVICE FEATURES

Refractory installations for HRT boiler settings Stirling boiler settings Integral furnace boilers Bark boilers for paper mills Recovery boilers Central station boilers

- Warehouse Materials available for rapid service.
- Skilled masons Available for scheduled or emergency jobs.
- Equipment Modern in all respects, including power saws, trucks, hoists.
- You can benefit from these facilities by securing the best job at lowest cost.

# PIEDMONT PRODUCTS COMPANY OFFICE: 206 E. STONEWALL STREET

CHARLOTTE, N. C.

Phone 3-2252 Night 4-6416

# Anemostat-Mississippi

ROBERT PORTER, 515 Yazoo Street, JACKSON, MISSISSIPPI, has been appointed representative for Southern Mississippi by ANEMOSTAT CORPORA-TION OF AMERICA.

Mr. Porter will serve customers in this important area on all matters involving air diffusers and the Anemotherm Air Meter.

### Industrial Exposition—Houston

Advanced designs of tools, machinery and materials for industrial operation will be on display at the INTERNATIONAL INDUSTRIAL EXPOSITION to be held in HOUSTON, TEXAS from March 11 to 17, 1951, under the management of Ed G. Lenzner, 41 San Jacinto St., Houston 2, Texas.

Equipment for all branches of industry will be shown and will include the chemical, petroleum and steel industries, industrial and powerplants, mills and shops of all kinds and sizes, and services that facilitate field and plant operation.

Demonstrations will be featured during the time the exposition is in progress and much of the equipment will be in operation. Among the demonstrations will be those showing welding technique, handling of materials and the practical application of safety equipment. Instrumentation and automatic controls will be given particular attention.

"You can engineer any trapping job with this book"

YOU CAN'T GO WRONG



Physical data and prices on all sizes and types of Arrestrong steam traps.



How to calculate condensate loads and solect traps for all classes of equipment.



Actual hot condensate capacity chart for every Armstrong trap, recommended safety factors and specific recommendations for many track of equipment.

THERE is no guess work about steam traps or steam trap selection when you have the 36-page Armstrong Steam Trap Book to work with. You don't waste money on traps that are too big for the job. You don't get inefficient drainage with traps that are too small.

This book explains the design, operation and advantages of Armstrong steam traps, specifies materials used, gives complete dimensional data, includes list prices, actual capacities under working conditions. There are 10 pages of tabular and technical data explaining how to calculate condensate loads and select the correct trap for the job, complete instructions on installation and maintenance. The Steam Trap Book also describes Armstrong traps for draining moisture from compressed air systems, Armstrong steam humidifiers for adding moisture to dry air and Armstrong non-condensable gas purgers for removing air from refrigeration systems.

Anyone is welcome to a copy of this useful guide to good trapping practice. Send for yours today.

ARMSTRONG MACHINE WORKS 806 Maple St., Three Rivers, Mich.

ARMSTRONG STEAM TRAPS



# U. S. Rubber-Port Neches, Texas

The PORT NECHES synthetic rubber plant which has been thoroughly modernized and reopened is being operated by UNITED STATES RUBBER COMPANY for the Reconstruction Finance Corporation. Production capacity has been increased from 60,000 to 72,000 long tons of GR-S all-purpose synthetic rubber a year.

# Reliance Appoints Boyd

THE RELIANCE ELECTRIC AND ENGINEERING COMPANY, Cleveland, Ohio, has appointed THE BOYD ENGINEERING COMPANY, INC., EL PASO, TEXAS, as sales representative for the western part of Texas. W. E. Boyd is president of the El Paso firm.

Boyd Engineering has specialized in consulting engineering work since 1938, and has been instrumental in engineering large equipment installations in mills, mines, and many Government projects. The company will also represent Reliance in New Mexico, Arizona, and part of Mexico

# Yale & Towne Appoints Executives

Five senior executive appointments in the manufacturing and sales management of the Philadelphia Division of YALE & TOWNE UFACTURING COMPANY have been announced by Elmer F. Twyman, Vice President in Charge of the Philadelphia Division.

This is part of a new program calculated to produce and distribute a record volume of Yale hoists, industrial trucks and dial scales required by the vastly enlarged combined demand for materials handling equipment from industry and the armed services.

The new senior executives are: James P. Kinney, General Sales Manager; James A. Shellenberger. Director of Advertising, Publicity and Market Research; John T. Mc-Carley, Manager of Production, a new post, to direct production control functions for all product lines; C. Eugene Moore, Works Manager, a new post responsible for all manufacturing operations and the maintenance of plant and equipment; and Bruno A. Moski, Chief Industrial Engineer, a new post responsible for all plant industrial engineering functions.

SPRINGVILLE (Erie County), N. Y.

# WOULD YOU PLAY A TOURNAMENT

with one club?

STEAM TRAPS ARE LIKE THAT

But on the golf course you can see the results. In steam hook-ups on the other hand, bad performance may go undetected for years, even though the traps apparently are working properly.

If you are in competition, it is certain that you cannot get the lowest fuel costs and highest production rates from steam heating and process equipment by "standardizing" on one type of steam trap for all purposes in your plant.

The four principal types of Sarco steam traps are illustrated at the right. They are available in a wide range of sizes and steam pressures and each has a specific function. The trick is to get the right trap on every steam job and every steam line in your plant. This can be done by calling in the Sarco Representative near you, or by asking for Sarco Catalog No. 1600 which gives recommendations for trapping all kinds of equipment, both indoors and out.

Thermostatic Trap



Float-Thermostatic Trap



Bucket Trap



Liquid Expansion Trap



SARCO SAVES STEAM SARCO COMPANY, INC.

Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO S, ONTARIO

IMPROVES PRODUCT

QUALITY AND OUTPUT

312



Idle equipment affects production schedules . . . influences product quality and many times cuts deeply into profits.

To keep equipment producing, use Belmont, the Packings that have individual characteristics and are scientifically designed and constructed by packing specialists to seal better and last longer.

Easy to get . . . Belmont Packings are stocked by local distributors in every large industrial center. Or, if you have a problem that requires special engineering attention, write direct.

Catalog #40 is available, write for it.

THERE'S A BELMONT PACKING FOR EVERY SERVICE

# THE BELMONT PACKING AND RUBBER CO.

Butler and Sepviva Streets
Philadelphia 37, Pa.



RINGS + SPIRALS + COILS + REELS SPOOLS + SHEETS + GASKETS

FOR STEAM . WATER . OIL . GAS . AIR . ACIDS . ALKALIES . AMMONIA

# Irvington Appoints Henderson

IRVINGTON VARNISH & INSULATOR COMPANY, Irvington, N. J., manufacturer of electrical insulations and insulating varnishes, has appointed L. V. Henderson, 140 Walker Street, S. W., Atlanta 3, Georgia, as Southern states representative. Mr. Henderson will handle the company's products for Florida, Alabama, Georgia, and most of Tennessee.

# Paisley Opens Charlotte Office

PAISLEY PRODUCTS, INC., has announced the opening of a sales and technical service office at 825 West Morehead St., CHARLOTTE, N. C.

The new office will provide sales and service coverage for NORTH AND SOUTH CAROLINA and parts of VIRGINIA, GEORGIA and EASTERN TENNESSEE. The full line of Paisley starch and dextrine based adhesives, flexible animal glues, resin and rubber emulsion cements and casein glues, will be handled.

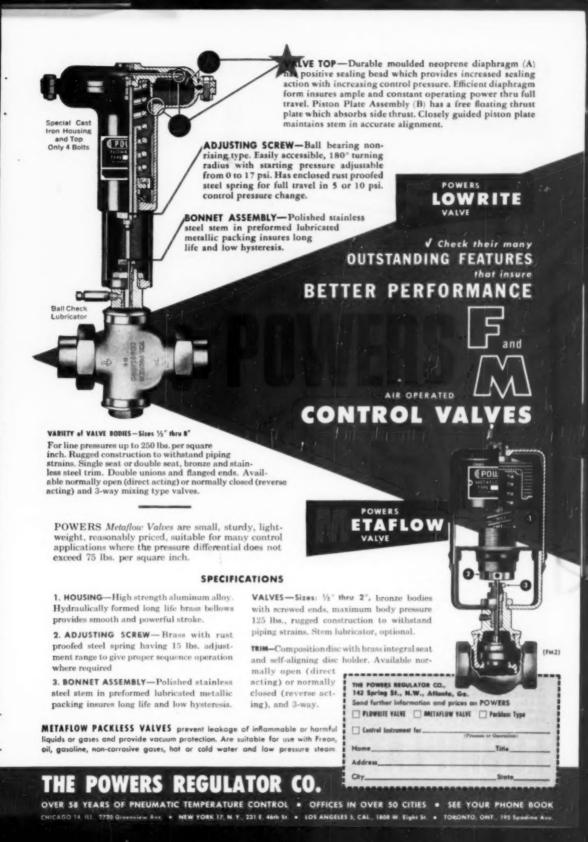
A separate department will specialize in the textile industry products, sizings and chemical specialties produced by the two firms.

The staff assigned to this new office includes Mr. MILTON F. LENZ on adhesives, Mr. Frank Martin on starches and dextrines and Mr. Lee Kritzer on textile industry products.

# Southern Building Code Congress Appointments

Southern Research Institute, 917
South 20th St., Birmingham, Ala., has been designated as a research facility for the Southern Building Code Congress in "recognition of outstanding results achieved for sponsors in developing and upgrading a wide variety of building materials produced in the South."

Announcement of the S. R. I.'s official designation was made today by JAMES W. MORGAN, Birmingham, president of the Southern Building CODE CONGRESS, organized for the more general adoption of modern performance building codes in thirteen Southern States. Other laboratories designated by the Congress for research in the field of building construction technology were the National Bureau of Standards, Washington, D. C.; the Underwriters' Laboratories, Chicago, Ill., and the Southwest Research Institute of San Antonio, Texas.



# LYNCH CORPORATION of Toledo, Ohio,

-a leading manufacturer of packaging machinery



# The following quotation is taken from a letter we received from their Director of Sales:

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With Lubriplate it is different. There is always a film of Lubriplate left on the machine after washing. This gives protection not only to moving parts, but also prevents general corrosion. The presence of salt and lactic acid in packing plants makes oxidation

a hazard. LUBRIPLATE prevents this too.

"Lubriplate greatly reduces unnecessary wear and prolongs the life of machines. It has reduced customer calls for service to a minimum. Our Service Engineers can readily spot machines that have had other than Lubriplate Lubrication, as these machines do not give the service they should.

"After using Lubriplate for over ten years, we are very well pleased with it and enthusiastically recommend it."

A LUBRICANT must be more than good to warrant such a recommendation. The Lynch Corporation, as well as hundreds of others who build machines to sell, not only use LUBRIPLATE Lubricants in their own shops, but also advise the buyers of the machines to always use LUBRIPLATE for re-lubrication.

LUBRIPLATE Lubricants are different from all other lubricants. They have properties all their own . . . they reduce friction and wear, prevent rust and corrosion and save power. They stay put under most adverse conditions and do not run out or wash away. There is a LUBRIPLATE Lubricant that is just the right density for your requirements. Let us tell you about it. Write today.

> LUBRIPLATE DIVISION Fiske Brothers Refining Company Newark 5, N. J. Toledo 5, Ohio

DEALERS EVERYWHERE—CONSULT YOUR
CLASSIFIED TELEPHONE BOOK

# LUBRIPLATE

THE MODERN LUBRICANT

# H. K. Porter Acquires Connors Steel

H. K. PORTER COMPANY, INC., Pittsburgh, Pennsylvania has acquired CONNORS STEEL COMPANY, INC. of BIRMINGHAM, ALABAMA.

The Connors Steel Company, one of the South's leading manufacturers of light steel products, produces steel billets from scrap by the electric furnace method and operates a series of rolling mills to manufacture finished products. The plant's total capacity exceeds 94,000 tons yearly.

# Daniel Builds Power Plant—Greenville, S. C.

The building program for the Greenville, South Carolina General Hospital advances as the new power plant goes into operation. This new plant which marks the first phase of the Hospital's \$5,000,000 building program is being constructed by the DANIEL CONSTRUCTION COMPANY OF GREENVILLE, SOUTN CAROLINA and BIRMINGHAM, ALABAMA. It is being built to take care not only of the present expansion of the Hospital but to also provide for any future expansion.

# SSIRCO to Distribute Nelson Studs

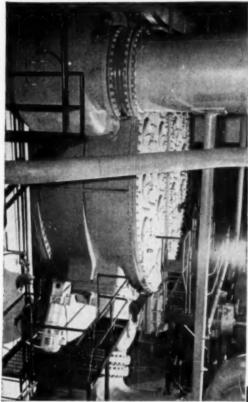
SOUTHERN STATES IRON ROOFING COMPANY, with headquarters in SA-VANNAH, GEORGIA, will distribute Nelson Rivweld studs in 13 southern states, according to Leonard C. Barr, vice president and general sales manager of Nelson Stud Welding Division of Morton Gregory Corporation.

Southern States distributes a broad line of nationally advertised building materials in conjunction with its manufacture and distribution of corrugated steel and aluminum roofing and siding.

The Nelson Rivweld method utilizes a portable stud welding gun by which fastener studs are speedily end welded to steel framing for securing corrugated roofing and siding sheets. The process provides top side application without the use of interior scaffolding.

Nelson studs will be stocked in the company's Atlanta, Georgia branch to permit overnight delivery to any of the 15 branch-warehouses operated by the company in Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee and Kentucky.

# "SELF-CLEANING" CONDENSER Eliminates 2 to 3 HOURS Daily Down-time



HERE'S HOW THE "REVERSE FLOW" PRINCIPLE WORKS ->

Both halves of this Dual Bank Condenser work the same but independently of each other.

Left Side: Water enters divided water box at valve chamber A, with left port open. It flows through pass B to end of condenser, back through pass C and out through upper port of D.

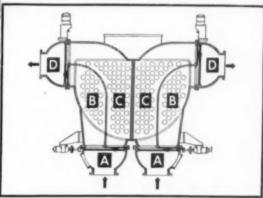
Right Side: Flow is reversed: Valves at inlet A and discharge D are changed to permit water to flow through C and back through B in the opposite direction, then out through lower port of D.

At Plant Atkinson, Harryat, Georgia, the Georgia Power Company draws circulating water from the Chattahoochee River. The inevitable sand, gravel, twigs and leaves used to clog condenser tubes and tube sheets in a matter of hours. Before the installation of a C. H. Wheeler Reverse Flow "Self-Cleaning" Condenser, it was a two- to three-hour job every day to remove anywhere from ½ to 2 yards of debris by hand. During this time, it was necessary to drop the load on the turbine to about half in order to operate against excessive back pressure.

Since September 5, 1949, when a C. H. Wheeler "Self-Cleaning" Condenser was installed, there hasn't been a single shut-down for cleaning. The Reverse Flow mechanism works flawlessly 24 hours a day, with 70,000 gallons per minute of river water passing through. The only cleaning is done by means of the electrically operated valves that reverse the flow of water through the condenser without interfering in any way with plant operation. This is done as often as necessary in a matter of minutes.

Through eliminating down-time for condenser cleaning, approximately one month of full capacity operation is added to the service of one of the four 60,000 KW turbo-generators in this 240,000 KW plant.

You, too, can benefit by C. H. Wheeler Engineering. Whether or not you need the self-cleaning Reverse Flow feature, it will pay you to "Investigate C. H. Wheeler Condensers before you Invest."



C.H. Wheeler OF PHILADELPHIA

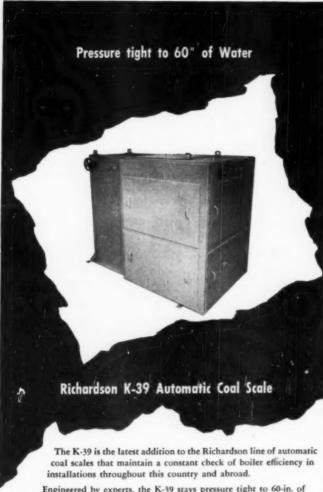
STEAM CONDENSERS—STEAM JET EJECTORS—COOLING TOWERS—VACUUM REFRIGERATION—HIGH VACUUM PROCESS EQUIPMENT—MICRO-PARTICLE REDUCTION MILLS—MARINE CONDENSERS & EJECTORS—DECK MACHINERY

C. H. WHEELER MANUFACTURING CO., 1804 SEDGLEY AVE., FHILADELPHIA 32, PA.

REPRESENTATIVES IN MOST PRINCIPAL CITIES

For complete story on this installation see page 74.

SOUTHERN POWER & INDUSTRY for DECEMBER, 1950



Engineered by experts, the K-39 stays pressure tight to 60-in. of water with consistent weighing accuracy. It prevents escape of primary air into the boiler room. It's unfailingly exact, checking coal consumption to within ounces by hour, shift or week. It enables you immediately to spot and correct inefficient steaming—makes for major savings in fuel for stoker or pulverizer-fired boilers in all sizes of central stations and power plants.

Bulletin No. 0250 gives complete details on how and why the Richardson K-39 Automatic Coal Scale means more efficient and economical fueling. Write for it today—or ask a Richardson Engineer to survey your present methods of checking on fuel consumption. There's no obligation.



# RICHARDSON SCALE COMPANY Clifton, New Jersey

Atlanta · Boston · Buffale · Chicago · Cincinnati · Houston · Minneapolis · Montreel
New York · Omoha · Philodelphia · Pittsburgh · San Francisco · Toronto · Wichita

# Kennedy Valve-Houston

THE KENNEDY VALVE Mrg. Co. announces the appointment of Shelby Herron, of Houston, Texas, as Sales Representative for the State of Texas.

Before joining the Kennedy organization, Herron was in sales engineering work in the oil field supply business. He has had wide experience in the machining and construction fields.

Herron will handle sales for the complete line of bronze and ironbody valves, waterworks valves and fire hydrants, malleable iron, bronze and cast iron fittings.

# Pennsalt-Montgomery

THE PENNSYLVANIA SALT MANUFACTURING COMPANY has announced the appointment of J. DRAKE WATSON as Southeastern District Manager of its new agricultural chemicals plant in Montgomery, Alabama. At the same time the company announced the appointment of Richard O. White to head up production at the new plant.

The new plant is expected to be ready for production on or about December 1. It will make available to growers in the Southeast a complete line of agricultural chemicals for use on cotton, peanuts, soybeans, potatoes and other crops and on livestock.

# Conference on Materials Handling Set For Chicago

A discussion of materials handling problems has been announced for the MATERIALS HANDLING CONFERENCE to be held at the International Amphitheatre, Chicago. The conference will be held during three of the five days of the fourth NATIONAL MATERIAL HANDLING SOCIETY and the exposition by the MATERIAL HANDLING INSTITUTE. Clapp and Poliak, Inc., New York, will conduct the exposition.

Unique features of the conference will include sponsorship of portions of the program by the society's regional chapters, and separate sessions devoted to industries with special problems.

The exposition will add an outdoor arena to its exhibit space in order to permit demonstrations of yard handling equipment. Exhibits will cover six acres indoors and four outdoors.

**7197** 

Unless you have used Standard Oil Lubricants throughout your plant, you'll never know the difference the *right kind* of lubrication can make. There is available to you in Standard Oil Lubricants the knowledge accumulated from

you'll never know

more than sixty years of lubrication service to southern industry, backed by the largest combined facilities for testing and research of petroleum

products in the world. ... If there is any question in your mind regarding the *proper* lubricant for any *specific* need, a Standard Oil lubrication engineer will survey your plant and blueprint your lubrication requirements. Why not take advantage of this experienced service today?





BONUS NO. 1

Because of the precision-machined, true ball joint, a Dart can be made leakproof without excessive wrenching. Installation is fast — no need to jam a Dart to get a tight joint.

# BONUS NO. 2

A Dart stays tight — bronze-to-bronze seats give longer wear — have higher resistance to pitting and corrosion. And body and nut of high test, air-refined, malleable iron are practically indestructible — shrug off wrench abuse and punishment in use.

### BONUS NO. 3

Because they never require jamming, the seats in a Dart union retain their true bearing surface — stay unmarred. Thus you can reinstall a Dart again and again — yet be sure of a tight joint.

For dividends in longer service, faster installation, always specify Darts.

E. M. DART MFG. CO. Providence 5, Rhode Island



# Cooper-Bessemer Odessa, Texas

The appointment of CLAYTON L. McDougall as sales and engineering representative to its Odessa, Texas Office, was recently made public by The COOPER-BESSEMER CORPORATION.

Mr. McDougall's assignment to this Odessa field office, under the direction of Arthur W. Abel, Jr., branch manager, is made with the purpose of further increasing engineering service to the petroleum industries. His sales engineering duties will concentrate on gas and diesel engines, engine-driven compressors and liquid pumps for petroleum processing and transmission service.

# Detrex Corp.—Dallas

Announcement has been made by DETREX CORPORATION, manufacturers of industrial cleaning equipment and chemicals, that GORDON A. JACOBS has been appointed representative in charge of the DALLAS Division, which includes the states of TEXAS, LOUIS-IANA, OKLAHOMA, and ARKANSAS.

Mr. Jacobs is a graduate engineer and has had broad experience in marketing, field servicing, and consulting on solvent vapor degreasing, alkali and emulsion cleaning, and rust-proofing.

# Cleveland Tramrail-Atlanta

CLEVELAND TRAMRAIL DIVISION,
The Cleveland Crane & Engineering
Co., Wickliffe, Ohio, has announced
the appointment of JOHN W. and
WM. H. CARLSON, 23 North Ave., N.
W., ATLANTA 3, GEORGIA as representative for the company.

## Cummins Appoints Sears— Atlanta

CUMMINS ENGINE COMPANY, INC., of Columbus, Ind., has appointed BURTON C. SEARS as assistant regional manager for the southeastern region. His headquarters are 800 Ponce de Leon Avenue, N.E., ATLANTA, GA.

A graduate of Purdue University, Sears has worked in the research and production departments of Cummins in Columbus; and as a sales engineer before being transferred to Atlanta. He will assist W. G. Turner, Regional Manager, in contacting customers in the southeast. If you need steam ...
you need WICKES



Throughout the world, industries that depend on steam have learned by experience to depend on Wickes Steam Generators. The Wickes Type S 2-Drum Boilers shown here have found wide acceptance in the chemical processing industry because the Type S boiler is adaptable to any standard method of firing — oil, gas, single retort underfeed or spreader stoker — and, because of the low head design, this boiler is practical where space is limited. Wickes can fill your most exacting requirements for steam generators up to 250,000 lbs. steam per hour and 850 pounds per square inch. If you have a boiler problem, our knowledge of steam generation is available to you without obligation... write today for descriptive literature on Wickes' complete line of steam generation equipment.

35,000 lbs. steam per hour from each of these two WICKES 2-Drum Steam Generators

250

# WICKES

# THE WICKES BOILER CO.

SAGINAW, MICHIGAN

DIVISION OF THE WICKES CORPORATION RECOGNIZED QUALITY SINCE 1854

SALES OFFICES: Adlanta \* Beston \* Chicage \* Cincinneti \* Denver \* Detroit

Houston \* Indianapolis \* Los Angeles \* Mihwaukee \* New Yark City \* Pittsburgh \* Saginaw \* San Francisco \* San Jose \* Springfield

Seattle \* St. Louis \* Tulsa \* Mexica City \* Buenes Aires \* Manila \* Havana \* Monterideo \* San Juan, P.R. \* Victoria, B.C.

# FOR EVERY SIZE INDUSTRIAL CLEANING JOB, THERE'S A HOFFMAN HEAVY DUTY Vacuum Cleaning System!



# 5 H.P. HOFFCO-VAC #50 PORTABLE

Improved design for high capacity, continuous cleaning. Operates two 50-foot lines of  $1\frac{1}{2}$ -inch hose simultaneously, or one 75- or 100-foot length of 2-inch hose.  $7\frac{1}{2}$  cubic foot dust capacity -48 sq. ft. of dust bag area. Write for Bulletin A-794.

# NEW! GAS-ENGINE POWERED HOFFCO-VAC #50 PORTABLE



Complete independence of power sources enables this model to operate where ordinary cleaners could not be used. Provides all of the outstanding features of the electric motor-driven model, above, except that power unit is a 4-cycle, single cylinder, heavy duty air-cooled gasoline engine rated at 6.8 H.P. (5.4 continuous), Write for Bulletin A-803.

# 11/2 H.P. HOFFCO-VAC #15 PORTABLE

Brand new heavy duty model with famous Hoffco-Vac ruggedness built into a compact, efficient design. Operates 35-foot length of 1½-inch hose. Provides maximum maneuverability for one-man handling in narrow, congested areas. Write for technical bulletin.



### 3 H.P. HOFFCO-VAC = 30

Unequalled efficiency and economy for its size, 4.4 cubic foot dust storage. Operates 50-foot length of 1½-inch hose. Write for Bulletin A-752.

### 71/2 H.P. HOFFCO-VAC =75

Provides higher suction for extra-heavy duty cleaning and maximum cleaning efficiency with simultaneous use of two 1½" hose either 25, 50 or 75 feet long. Or, 2" hose, 25, 50, 75 and 100 feet long. Write for details.

# STATIONARY SYSTEMS IN SIZES 3 TO 100 H.P.

Permit cleaning in several areas simultaneously. Dust is conveyed pneumatically through flexible hose coupled to convenient inlet valves in a permanent piping system. Central collection for easy disposal. Widely used on production operations as well as on plant cleaning.



# WRITE FOR BULLETINS AND FREE SURVEY!

CANADIAN PLANT CANADIAN HOFFMAN MACHINERY

SE EAST 1215 STREET NEW YORK J. N.Y.

CANADIAN PLANT CANADIAN HOFFMAN MACHINERY CO. LID. NEWMARKET DATE

Allegheny Ludlum-Birmingham

Appointment of ROYDEN C. PRES-LEY as District Sales Manager of the BIRMINGHAM, ALA., area of ALLE-GHENY LUDLAM STEEL CORPORATION has been announced.

Mr. Presley joined the sales force in 1941 working out of the Chicago District Office. In 1942 he transferred to the Tool Steel Sales Division, working as assistant to the manager, transferring the following year to Minneapolis, Minn., as Sales Representative. He was appointed District Sales Manager of the Toledo territory in 1949. He is a member of the American Society for Metals and the American Society of Tool Engineers.

# Automatic-St. Louis

Opening of its new, modern sales and service headquarters at 3014-16 Olive Street, St. Louis, was announced by the John J. Connell Company, St. Louis area representative for the Automatic Transportation Company, Chicago, manufacturer of electric industrial trucks.

## Woods Elected by Thermatomic Carbon

J. ALBERT WOODS has been elected Chairman of the Board of THERMATOMIC CARBON COMPANY, replacing Major T. P. Walker, who has retired as Chairman. MAYNARD C. WHEELER, who is a director of the company, was named President; and HOWARD L. SANDERS, also a director, was named a Vice President. CLARK C. BOARDMAN continues as Resident Manager of the company's plant at STERLINGTON, LA.

### Monsento Plant-Decatur, Alabama

Plans for the construction of a multi-million dollar plant to manufacture a new synthetic fiber for the CHEMSTRAND CORPORATION have been announced by MONSANTO CHEMICAL COMPANY and AMERICAN VISCOSE CORPORATION, joint owners of the Chemstrand Corporation.

Plans call for the plant to be erected on a 656-acre site west of DECATUR, ALABAMA, on the Tennessee River. Construction is expected to get under way in 1951.

DR. CARROLL A. HOCKWALT of St. Louis, a Monsanto vice president, is president of the new corporation. JimThese Sprague on the spot

These Sprague on the spot

Power Factor Capacitors look
like the perfect answer to
our power problem. Check it!

B. J. G.

# SPRAGUE CAPACITORS Save You Money!

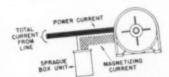
Whether you buy your power from a public utility company or produce it yourself, *low* power factor represents needless, moneywasting inefficiency.

Install Sprague Power Factor Capacitors right at the source of waste, and you'll be providing in effect a local generator which supplies—at low cost—the non-productive magnetizing current required by the load. Savings are often extensive enough to repay the cost of the installation in a year's time.

For an estimate on how much you can save by correcting power factor the efficient way, call in a Sprague representative. You'll be under no obligation. Or, write for our free booklet of cost-saving suggestions, Catalog 50B, today.



This induction motor is operating under partially loaded conditions without Power Factor Correction. The feeder line must supply BOTH magnetizing (reactive) and power circuits.



Here's the result of installing a Sprague Capacitor to supply the magnetizing current required. Total requirement is reduced to power current only, thus either reducing power cost or permitting the use of more electrical equipment on the same circuit.

# SPRAGUE

SPRAGUE ELECTRIC COMPANY

torin Adams, Massachusells

ELECTRIC AND ELECTRONIC DEVELOPMENT

# NEW EQUIPMENT for Southern Industry

### Speed Reducer

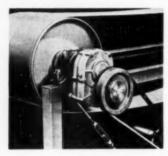
The DODGE MANUFACTURING CORPORATION, Mishawaka, Ind., has added to its line of power transmission equipment the Torque-Arm Speed Reducer, designed as a package item. This speed reducer mounts directly on the shaft to be driven and is said to eliminate the necessity for special engineering.

The unit has been designed primarily for conveyors, bucket elevators, agitators, mixers, feeders, processors and similar machinery. It consists of a reducer with a fixed ratio of 15 to 1, driven by a motor through any V-belt or flat belt drive. Any output speed from 13 to 133 rpm can be obtained through the use of stock sheaves. The reducer contains a double train of helical steel gears, heat treated and shaved. It is locked

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card. to the shaft by steel locking collars. A bushing keyed into the sleeve adapts the sleeve to any desired shaft size. The size No. 1 unit weighs only 35 pounds.

A torque arm anchors the reducer and provides adjustment of the belt tension through the use of a turn buckle. Whenever it is re-



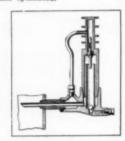
quired to prevent reversal of the load a back-stop is available which is easily installed on the input and sealed from dust inside the cast iron housing.

The unit is available in six sizes with capacities up to 28.5 hp.

### Steam Cylinder Lubrication

N-3

SHARVANIA OIL & GREASE
CORPORATION, 1185 Tulley
St., Memphis 1, Tennessee
has announced a new lubricating
instrument, LUBE-O-MIZER for
steam cylinders.



The device is said to automatically retard the lubricant within itself, and mixes it with condensed steam. The mixture is then heated and forced into steam cylinders in the form of "fog". This "oil-fog" is carried in suspension by the steam to completely cover all contact working surfaces of cylinder walls, rings and valves. Additional operating data will be furnished upon request.

### Silver Plating Powder

N-2

COOL-AMP COMPANY, 8603
S. W. 17th Avenue, Portland, Oregon, has developed a new method of silver plating high amperage electrical connections on the job. The new silver plating powder is said to be especially desirable for improving continuity of electrical service and reducing maintenance time and costs.

The only equipment needed for application is a sharp steel wire brush or abrasive cloth, a clean rag and water. The copper or bronze is first polished with the wire brush or abrasive cloth, wiped dry, and the silver powder is rubbed on with a slightly damp cloth pad.

The manufacturer states that one pound of the powder will silver plate approximately 6,000 sq in. It retails for \$11.50 per pound.





the top choice of American Industry

> This 1500-pound Cast Steel Pressure Seal Gate Valve with an electric motor operator is one of many Powell designs for the modern Power Plant.

Powell Makes a Complete Line\* of Valves especially adapted to meet the flow control requirements of YOUR industry.

\*The Complete Line includes valves in Bronze, Iron, Steel and the widest selection of Corrosion-Resisting metals and alloys ever made available to Industry.

> Quality fine throughout "The Line"

POWELL

PATENTED

POWELL

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio.

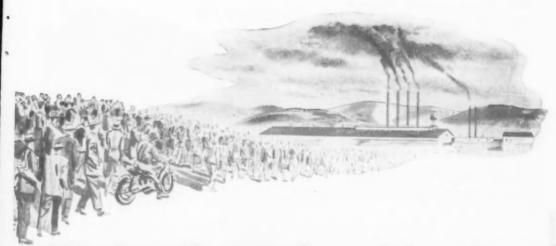
# YOU CAN BE SURE .. IF IT'S Westinghouse



### SOUTHERN PAPER—MORE PLANTS, PEOPLE, PROFIT

Growing factor in the Southern economy is the paper industry. In the past ten years, its labor force climbed 74%, and dollar volume jumped 4% times!

Westinghouse helps paper mills solve production problems, helps them grow. For example, the big motor above, at Camp Manufacturing Co., Franklin, Va., drives a log chipper which chews up 22-inch logs like a giant's pencil sharpener. The logs fall 10 feet, crash into whirling knife blades with a battering-ram impact. No ordinary drive motor would take it, so Westinghouse engineers designed a 250-hp motor with a tremendous built-in flywheel effect. This motor stores up energy, stands the impact and keeps Camp turning out chips for paper production.



# Why has the Southern labor force jumped 50% in ten years?

Count up the production workers in the south—the men who turn out the goods. Since 1939, they've increased by one million men, a better than 50% gain. They're on the job in new plants and expanded plants—because abundant raw materials, good markets and transportation make the South an excellent place to do business.

Early in our company's history, Westinghouse realized these advantages and built manufacturing plants in the South. Today our 15 Southern plants pay wages to almost 4,000 employees. They buy raw materials from Southern mines, mills, farms and forests. And they produce top-notch electrical equip-

ment that helps other industries expand in the South.

Abundant power is one of the big factors in Southern growth. And much of the apparatus generating the South's power was engineered by Westinghouse. At the same time, the best in electrical-using equipment supplied by Westinghouse helps Southern industries get the most out of this power. The paper mill equipment on the opposite page is a good example.

Westinghouse has deep roots in the South, a basic stake in its future, and a firm understanding of the problems of Southern industry and power. And that makes your Westinghouse office a good place to go when you have a job for electricity.

J-94828

Westinghouse
A BASIC PART
OF THE SOUTH



### ONE BASIC PUMP SERVES TWO DIFFERENT NEEDS

This heavy duty, single-stage, single-suction pump handles pulp stock and acid or liquor . . . easily converts to meet production changes or replacement needs.

### **OUICK CONVERSION FROM** ONE JOB TO ANOTHER!

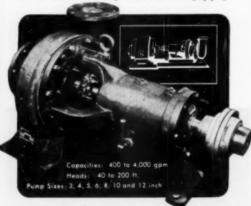
Converts from pulp stock handling to acid-liquor service by merely changing a few pump parts. For hot service, a water-jacketed stuffing box is easily added.

### SMALL NUMBER OF SPARE PARTS SERVES MANY PUMPS

By standardizing on these pumps, you also economize on spare parts - a small number of interchangeable parts protects a large number of pumps.

### EASILY REPAIRED WITHOUT DISTURBING PIPING

Dismantling is simple. Entire bracket, rotating element and pump cover can be unbolted and lifted free from the case without disturbing suction and discharge piping.



STANDARDIZE ON THE



for pulp stock and acid or liquor handling

### yron Jackson Co.

Since 1872

P.O. Bex 2017 Terminal Annex, Los Angeles 54, Calif. OFFICES IN PRINCIPAL CITIES

For full details, write for Bulletin No. 48-9000



There's over 70 years know-how built into Consolidated Maxiflow Safety Valves

Maxiflow Safety Valves are new is all that modern registering can contribute. But every feature of these valves has been proved by feed experience over many years, and by long-time and severe testing methods.

In high pressure, high temperature installations, Maxiflow performance establishes a new standard in safety, efficiency and economy.

These Maxiflow design features mean important operating advantages:

tant operating advantages:

Thermodisc Seat permits rapid equalization of temperature differentials. Thermal stresses are minimized, seat distortion cannot take place, permanent tightness is achieved.

Blowdown Control adjustable to a new, low minimum. The exclusive "micrometer" trim ring provides a simple and practical chatter-proof blowdown control, externally controlled and operable with valve under pressure.

Mechanical Through Bushing with precision machined surfaces that provide constant entrance conditions for steam flow. Eliminates leakage due to porus castings.

Retention of Popping Point is achieved by combining proper compensation with materials having low coefficients of expansion.

For complete description, plus capacity tables, write for the Consolidated Maxiflow Safety Valve Bulletin.





A Product of

MANNING, MAXWELL & MOORE, INC. BRIDGEPORT 2. CONNECTICUT

Makers of 'Cansolidated' Safety and Relief Valves, 'American' Industrial and 'Microsen' Electrical Instruments, 'Hancock' Valves and 'Ashcroft' Gauges. Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists, and other lifting specialties

### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

### Industrial Adhesive

N-4
PAISLEY PRODUCTS, INC., 1770 Canalport Ave., Chicago 16, III., is producing a paper to metal labeling adhesive known as "Resiment", which is said to be useful for a wide variety of bonding operations. The manufacturer recommends it for combining and laminating operations on similar and dis-similar materials, such as cork to metal, felt to cardboard, paper to glass, fabrics to metal, and for use with many plastics.

This semi-fluid, white, latex-resin emulsion adhesive weighs 8.4 lb per gallon, is dilutable with water, and can be applied by hand brushing, gumming machines, or spray guns.

### Counting Equipment

N-5
PHOTOSWITCH INCORPORATED,
77 Broadway, Cambridge
42, Mass., is offering several new photoelectric counter combinations.



Counter Set P2C consists of photoelectric control with phototube and light source located in small remote housings. It features simplicity of installation. No wiring is necessary. The control is powered through a line cord with a male plug connection which fits any standard lighting outlet. This supplies the power as well for the light source, electric counter, and photo-electric scanner, all of which have cables and plugs for connection to the control.

### **4 MILLION TONS OF COAL CRUSHED**

with a parts replacement cost of only \$.0005 per ton



in continuous service for 10 years reduces 300 TPH 6" x 11/4" washed coal to 100% passing 11/4" screen

AT THE LITTLE SISTER COAL CORPORATION (St. David, III.) . . . this crusher is giving a performance that is typically American—typical because American Crushers are engineered to "take it", and are tested in actual use. They slash power and labor costs too, and cut out-of-service time to a minimum. Here are a few construction "whys" behind American records—

THE HEAT TREATED ALLOY STEEL MAIN ROTOR SHAFT—revolves on heavy duty Timken Bearings enclosed in dust and oil-tight pillow blocks. Perfect balance eliminates vibration.

THE HEAVY RIBBED SECTIONAL FRAME—Cast Steel—permits accessibility and adjustability . . . bearing pedestals are cast integral with side frames to assure rigidity.

THE ALL-MANGANESE STEEL CRUSHING PARTS include renewable Breaker and Grinding Plate, also Crushing Chamber Cheek Liners. Grinding Plate is adjustable to compensate for long wear.



REVERSIBLE SHREDDES
RINGS split coal instead of
crashing it—assure uniform,
high fennage reduction
while operating at slow,
power-seving speeds.

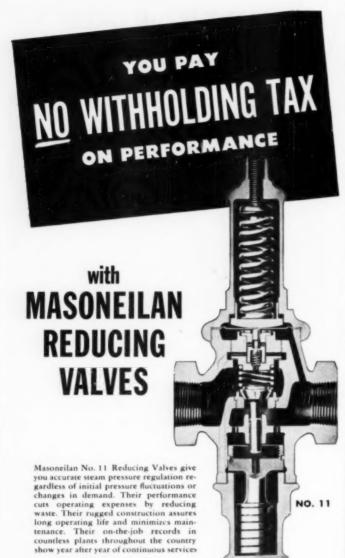
Originators and Manufacturers of

Representative analyze your crushing problem
Write for details on the complete line of American Crushers

PULVERIZER COMPANY

1243 MACKLIND AVE.

ST. LOUIS 10, MO.



CHECK THESE FEATURES -

- Stainless steel main valve, auxiliary valve and seat rings are standard... at no extra cost.
- e Wide range of adjustment without spring change.
- Large capacity due to pilot operation, permits use of smaller size regulators . . . saves in original cost.

Initial pressures up to 250 lbs. reduced to any desired pressure between 5 and 75 lbs. or 75 and 225 lbs. Sizes ½" to 2" bronze; 2½" to 4" iron.

### MASON-NEILAN REGULATOR CO.

Sales Offices or Distributors in the Following Cities: New York - Syzacus - Chicago - St. Louis Philadelphia - Houston - Denver - Pittsburgh - Cleveland - Cincinnati - Tulsa - Atlanta - Detroit Los Angeles - San Francisco - Salt Lake City - El Paso - Biose - Albuquerque - Charlotte, N. C. Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

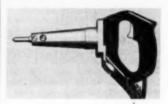
### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

### Rivet Gun

N-6

RIPLEY COMPANY, INC.,
Middletown, Conn., has announced a rivet gun using
Du Pont explosive rivets for high
speed operation in blind, hard-toget-at spots. No hammer or bucking
bar is required.



The tips are made of nichrome steel welded to a bronze base. The handle consists of two-piece molded Phenolic in which is located a switch for easy manipulation on heavy production work. The manufacturer recommends the rivet gun for maintenance, repairs, and other industrial applications.

### **Drill Press Vise**

N-7

CHICAGO TOOL AND ENGINEERING Co., 8383 South
Chicago Ave., Chicago 17,
III., has announced a new drill press
vise. This new model is designed for



shop operations which would otherwise require jigs and fixtures for milling, drilling, grinding, and other jobs.

The new vise has jaws 3½" wide, opens 3½", and has a jaw depth of 1½". The movable jaw is grooved vertically for holding round work. The overall height is only 2½ inches.



We think it's time to call a spade a spade...time to point out that these subsidized carriers can destroy but not supplant the self-reliant railroads... time to urge that simple justice be done for the good

of all America and all taxpayers.

Ernest E. norris

President

SOUTHERN RAILWAY SYSTEM



# Cut Down Insulation Upkeep



PC Foamplas insulates this typical equipment used in the manufacture of penicillin, where temperatures range from 0°F, to 200°F. This efficient, long lasting insulation is available in standard flat blocks, curved segments and beveled lags, to fit equipment sides, heads and domes, and in preformed sections for standard pipe sizes and fittings.

I takes a mighty effective insulation to keep power and industrial plants running effectively. And it takes a mighty economical insulation to keep them running economically. That is why so many plant superintendents are installing PC Foamglas on indoor and outdoor piping and fittings, on tanks, towers and other processing equipment.

Its cellular glass structure makes PC Foamglas an effective insulation. Millions of minute sealed glass cells form an effective harrier to heat travel, thus help to maintain desired temperatures, to minimize condensation.

Then too, being glass, Foamglas has unusually high resistance to moisture, vapor, acid atmospheres and other elements that cause some materials to lose insulating efficiency. Consequent freedom from repairs, maintenance and replacement makes PC Foamglas a truly economical insulating material. When properly installed PC Foamglas retains its original insulating effectiveness.

It will pay you to know all the advantages you get with PC Foamglas. Our specialists will be glad to consult with you regarding your individual insulating problems. Our literature will give you complete information and specifications on the usual applications of Foamglas. Send in the convenient coupon today. Your free copy of our booklet — and a sample of the material—will be mailed to you promptly.

### This is FOAMGLAS®

The entire strong, rigid block is composed of millions of sealed glass bubblss. They form a continuous structure which has unavaully high resistance to moisture, vapor and exid atmospheres, is nancombustible, varningsroof and adorless. In those closed glass cells, which contain still oir, lies the secret of the material's long life insidating efficients.



-	
	Pittsburgh Corning Corporation Dept. AB-120, 307 Fourth Avenue Pittsburgh 22, Pa.
	Please send me without obligation, a sample of Foamglas and your rms booklet on the use of PC Foamglas for Industrial Insulation.
	Name
	Address
	ene ene



### FOAMGLAS INSULATION

When you insulate with FOAMGLAS... the insulation lasts!

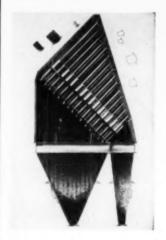
### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

**Dust Collector** 

N-8

PRAT-DANIEL CORPORATION.
82-10 Water Street, East
Port Chester, Conn., has
developed a tubular dust collector
that permits the re-firing into boiler
furnaces of high carbon particles
without causing recirculating of all
of the fly ash through the boiler,
dust collector and induced draft fan.



Separation of high carbon particles from the fly-ash of low carbon content is accomplished within a single unit and with one pass of the gases. Two hoppers are provided; the larger particles, suitable for re-firing are decanted into one system for reuse; the low carbon particles are deposited in a separate system for disposal.

According to the manufacturer this method in no way increases the normal resistance through the dust collector unit; and the continuous removal of fly ash avoids the erosion and damage to metal surfaces that result when the total dust is reinjected without such separation.

The process and equipment are described in a bulletin "P-D Decantation", which will be sent on request by Thermix Corp., Greenwich, Conn., Sales and Project Engineers for Prat-Daniel products.



... then a Warren Cradle Mounted Compacunit could be the answer. This versatile, efficient and sturdy pump is built to "stand the gaff"... and the price lower than you might expect for a quality product of this kind.

Sizes: 1", 1½", 2", 3" Capacities: 5 to 450 G. P. M. Heads: 15 to 500 feet

Materials: Standard, All Iron, All Bronze, or special to meet your requirements

Why not check this pump against your next pumping job, if within the indicated operating conditions? Ask for bulletin #242

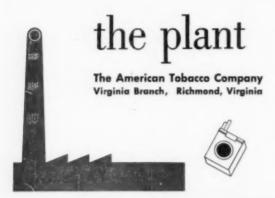
WARREN STEAM PUMP COMPANY, INC.

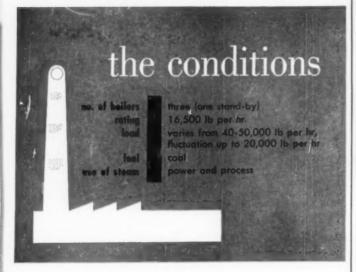


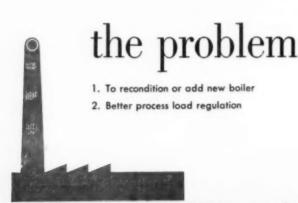


WARREN, MASSACHUSETTS

PUMPS







THE HAYS CORPORATION gets results

### New Transformer Finish

WESTINGHOUSE ELECTRIC CORPORATION, 306 Fourth Ave., Pittsburgh 30, Pa., has developed a three-coat, micabase paint system for transformers. The life of the finish on pole-type distribution transformers is said to have been more than doubled by this "Coastal Finish". Each coat functions cooperatively with the others to withstand the oxygen, acids, salts and alkalis found in seacoast and industrial atmospheres. The system is applied in the same manner as standard finishes and in production is baked on.



The first coat is applied after the metal has been cleaned and treated with phosphate solutions to form an ideal surface. Zinc chromate combined with iron oxides in a suitable vehicle provide a coat with desired flexibility for thermal expansion and contraction and for chemical resistance to salts, acids, and alkalis. Addition of iron oxide makes the coat less brittle.

The intermediate coat is the key to the performance of the finish. Mica flakes in a vehicle of modified phenolic and alkyd resins are said to give great resistance to heat, oxygen, salts, acids, and alkalis. The mica flakes ward off moisture and oxygen. The manufacturer states that the mica enhances heat stability of the paint as much as ten times at the elevated temperatures at which distribution transformers operate.

The third coat screens out ultraviolet light from the sun, strengthens resistance of the other two coats to corrosive elements, and adds to appearance.

### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

### Fork Trucks

N-10

BAKER INDUSTRIAL TRUCK
DIVISION OF THE BAKERRAULANG COMPANY, 1250
West 80th St., has announced production of a center-control fork
truck to handle 5000 and 6000 lb

A unit-welded, deep-section steel plate frame contains an integral hydraulic tank. Heavy formed channels welded into a unit assembly form the upright guides. Pivot, tilt and hose connections are said to be designed so that the uprights can be removed in twenty minutes.

With 83 inches overall height standard telescoping lift is 126 inches, and where overhead obstructions are a factor, 61 inches of initial lift is provided. The lift and tilt mechanism is hydraulically operated.

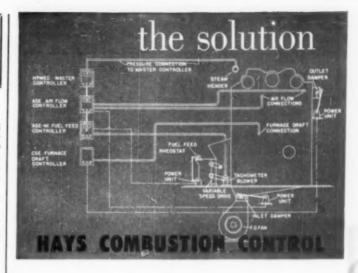
### Impact Tool

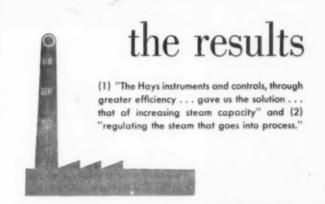
N-11

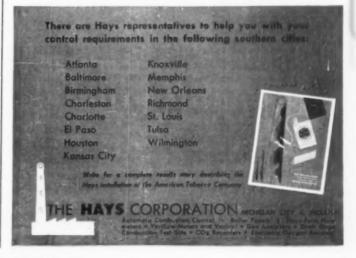
H. K. PORTER, INC., Somerville 43, Mass., has introduced a new tool for tightening or loosening nuts, bolts or screws, known as the "Impakdriver".



The manufacturer recommends this general purpose tool for industrial repairs, maintenance, installation and production operations. It is adaptable for various types of equipment and machinery. The product is available separately or in sets including bits, sockets, and tray.









### Tube Control

N-12 1800 Cuyler Ave., Dept. 2-25, Chicago 13, Ill., has announced a new and simplified tube rolling control. This new electrically operated device can be used for rolling of both ferrous and non-ferrous tubing

Marketed under the trade name "John Crane Control", the unit is a precision instrument designed for heavy duty service. It has only two electrical working parts, shockproof mounted and enclosed in an aluminum cabinet. The electrical parts form a separate unit which can be replaced when necessary. The unit is light in weight and absence of a voltage regulator adds to its mobility on the job. It has no electronic tubes. The simplicity of design and operation is said to reduce maintenance to a minimum.

### Steam Traps

The V. D. ANDERSON COM-N-13 PANY, 1936 West 96th St., Cleveland 2, Ohio, has announced the production of inexpensive small forged steel steam traps for high pressure, super-heated steam service. These traps are suitable for steam pressures up to 500 lb with 800 degrees total temperature and have 14" or 34" pipe connections. Head and body are of forged steel to withstand shock and explosions. The internal parts are of stainless steel with valve and seat of a special alloy developed by the manufacturer. These traps have a recessed gasket to prevent blowing out.



Mr. Insulation says: "Buying insulation is like buying a suit of clothes: -the better the materials; the more expert the tailoring, the better

Just as no one cloth can be used for every suit of clothes, there is no one raw material that can serve as the ideal insulator for every industrial insulation job.

your investment"

For this reason, Johns-Manville manufactures a wide variety of industrial insulations-of asbestos and other raw materials-each of which is designed for a special purpose. These insulations span the entire range of temperatures from 400 F below zero to 3000 F above.

But, again, there is much more to the story of insulations than their manufacture. In order

to get the greatest return from your investment in them, they must be expertly engineered to the job, and then skillfully applied.

Johns-Manville makes available to you the service of experienced insulation engineers, and highly skilled mechanics for the proper application of Johns-Manville insulations.

If you are contemplating an insulation installation for your plant, it will pay you to look into this Johns-Manville insulation service. For further information just write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville first in



### Round-the-Clock Fire Watchman

# NOW ON Duty



### IN SWITCHGEAR CUBICLES OF LEADING SOUTHERN GENERATING STATION

Fire, even a small one, in generating station switchgear cubicles can short circuit distribution facilities...create unwarranted loss of voltage...destroy essential equipment.

That's why a leading southern power company recently installed, in one of its generating stations, modern, approved C-O-TWO fire protection.

Four automatic fire extinguishing systems were installed to protect the various switchgear cubicles from that inevitable, destructive enemy... fire. If fire should strike, quick-acting, clean, non-damaging, non-conducting carbon dioxide blankets the stricken area and extinguishes the blaze in seconds before it spreads and causes extensive damage. There is no after fire mess to clean up, no

lingering odors, no water damage with carbon dioxide.

C-O-TWO offers complete carbon dioxide type fire extinguishing equipment . . . hand portables, wheeled portables, hose units, high pressure cylinder systems and low pressure storage tank systems; plus smoke and heat fire detecting systems and dry chemical type fire extinguishers . . . all render fast, positive action against fire.

So, whatever your fire protection problem, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today . . . tell us about your particular fire hazards, our experience is at your disposal. There is no obligation to you of course.



### C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 . NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT
Squeez-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Corbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Hoat Fire Detecting Systems

### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Slide-Set Vise

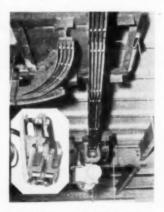
N-14
The Dodge Manufacturing Corporation, Mishawka, Ind., has announced a new quick action, machinist's vise, built on a new principle and embodying a patented fast slide action. The Product is known as the Dodge Slide-Set Vise.



The vise opens or closes to any position in one second through a push-pull action which eliminates spinning the handle. It weighs 58 pounds. It is built with either a swivel or stationary base and is available in the 4-inch size only.

### Tramrail Shielded Electrification

N-15 2086 Random Road, Cleveland 6, Ohio has developed a tramrail and crane shielded electrification system for three-phase operation with capacities to 600 volts at 75 amperes. The new equipment is



# SEVEN PENSTOCKS for the Clark Hill Dam

Above: Artist's drawing showing the Clark Hill Jam, impounded reservoir and powerhouse. This is the first in a series of eleven projects for the comprehensive development of the Savannah River for flood control, navigation and hydro-electric power.

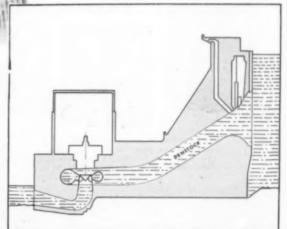
Below: Diagrammatic cross section of the Clark Hill Dam intakes, penstocks and powerbouse.

When the project is completed, there will be seven penstocks through the dam for carrying water to seven turbines.

The view directly above shows the first few rings of one of the seven welded steel penstocks we installed at the Clark Hill Dam on the Savannah River near Augusta, Georgia.

The penstocks are 20 ft. in diam. by 110 ft. long. We fabricated them at our Birmingham plant and assembled the sections at the dam site. Each penstock will carry up to 4,860 cubic feet of water per second to its turbine. The operating head will vary from 112 to 151 ft. When operating under a head of 136 ft., each turbine will produce about 55,000 horsepower.

Penstocks are typical examples of the heavy steel plate work we are equipped to fabricate and erect. Write our nearest office for estimates or quotations when you need heavy steel plate structures.



### CHICAGO BRIDGE & IRON COMPANY

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\*Fan-planning means the selection and placement of fans to ventilate your buildings most effectively and economically. Costs of Emerson-Electric high-quality long-life equipment are quickly written off in terms of improved worker efficiency and customer relations. Emerson-Electric's free fan-planning service brings 60 years of unmatched fan experience to your individual problems. See your electrical contractor, or write for Bulletin No. 582.

The EMERSON ELECTRIC MFG. CO., St. Louis 21, Me.

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SAVE — with our new economy line, built for easy installation and rugged service! 12-, 16-, and 18-inch direct-drive fans, complete with automatic outside shutters mounted integral with fan frame. Write today!



BELT-DRIVE EXHAUST FAMS — longlife, slow-speed models in 24-, 30-, 36-, 42-, and 48-inch sizes, exhausting up to 19,350 CFM.

DIRECT-DRIVE EXHAUST FANG — five top-quality models, blade sizes 12 to 30 inches. Fully-enclosed ballbearing motors; quiet overlapping blade assemblies.



EMERSON ELECTRIC

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designed to reduce arcing and flashing of conductor bars by use of large area shoe contacts with individual springs in each shoe.

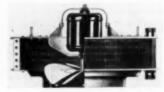
Installed directly below the tramrail track tread, the system is said to offer operating and maintenance personnel more complete protection from electrical hazards commonly encountered with open, unprotected conductor bars. Chance for casual contact is minimized by combining the safer under-the-track location with a compact 16 gauge sheet metal housing which shields conductor bars from the top and sides. Housing prevents dust accumulation and danger of fire from resultant flashover. On outside installations the housing protects conductor bars from rain and ice formation.

These shielded electrification systems are factory fabricated in 10foot lengths for erection on the job.

### Projection Unit Heaters

N-16 The Trane Company, La Crosse, Wis., has announced design change in its projection unit heater line.

The over-all dimensions remain the same, but an offset roll has been added to the bottom to give added



rigidity and improved appearance. Only the motor and housing brackets protrude beyond the top of the unit. Bracing is done beneath the top plate for added strength.

The new series includes a model which has a 35" fan and a 451,000 Btu capacity. Capacities for other models range from 55,300 Btu to 550,000 Btu.

A new hydraulically expanded coil is used on these units. The tubes are expanded under pressure of 3000 psi. The unit is said to be easier to clean and maintain than previous models.

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### HONEYWELL BYPASS



THE Honeywell Bypass is a completely assembled and ready-to-use unit . . . compact and convenient. It eliminates from eight to fourteen threaded joints . . . with the usual leakage and maintenance . . . and affords continuous, trouble-free operation.

Yet it costs no more than the assortment of valves, nipples, fittings, unions and pipes (plus the cutting, threading and assembling) that you may be using now. The Honeywell Bypass is available in Bronze, Iron and Steel... for pressures up to 300 lbs... with screwed or flanged ends.

Call in your local Honeywell engineer for detailed information on this bypass and such other Honeywell products as: Hi-Lift Hand Control Valves, Transfer Valves, Narrow Band Diaphragm Control Valves, Liquid Level Devices and Steam-Jacketed Rotary Cocks.

Write, today, for a copy of Bulletin #254-1. MINNEAPOLIS-HONEYWELLREGULATORCO., Industrial Division, 1902 Windrim Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

Honeywell

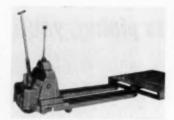
VALVE PRODUCTS

### Pallet Load-Lift

N-17

The Marker Forge Company, 25 Garvey St., Everett, Mass., is offering a newly designed aluminum alloy pallet lift truck, featuring special wheels that automatically retract when the forks are in a lowered position.

The truck, supported on two front wheels and two auxiliary wheels on a very short wheel base, turns around in a very limited space and will lift wherever a man can stand.



The rear wheels are one inch above the floor and thereby enter and leave the pallet without interference or damage to the bottom boards. Operating the lifting handle automatically brings rear load wheels down to the floor and raises auxiliary wheels.

The rear wheels are closely centered and tandem articulated to cross over floor obstructions and

elevator inequalities.

### Indicating Fuse Cutoff

N-18

General Electric Company, Transformer and Allied Product Divisions,
Schenectady, N. Y., has announced a new 100 amp heavy duty enclosed indicating fuse cutout for use on high capacity distribution feeders or wherever high interrupting capacity is wanted. The new cutout has an interrupting rating of 5000 rms-amps at 2500 volts.



Housing is constructed of wetprocess porcelain, glazed inside and out, and has a hangar support cemented into the back. Contact clips and terminals, silver plated for high conductivity, are cemented into the housing interior. Two large diameter silicon bronze screws clamp the line conductor securely.

A barrier of synthetic sponge rubber forms a seal between the upper and lower contacts and prevents are gases from causing flashovers. When the fusible section of the fuselink melts, a spring-operated indicator arm pulls the cable downward and completely out of the tube, assuring quick interruption even with 1 amp links. The protruding indicator arm shows that the fuse has blown.



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### FOR LEAKPROOF, TROUBLE-FREE PIPE RUNS



On all types of piping jobs where Type "B" copper or red brass pipe is used, trouble can be avoided by installing Silbraz\* joints — made with Walseal valves, fittings and flanges.

Threadless, patented Silbraz joints are silver brazed (not soft soldered) pipe joints that are leakproof, trouble-free — permanent ... connections that will not creep or pull apart; that literally join with the piping system to form a "one-piece pipe line". Thus, these modern joints eliminate the need for maintenance and costly repairs — especially important where lowered operating costs are imperative.

For complete details on the modern Silbraz joint, made with Walseal products, write for a copy of Walworth Circular 84.

\*Perented - Reg. U. S. Patent Office.

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### WALWORTH

Valves and fiftings

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**Boiler Feed Lines** 

Steam Return Lines

Condensate Lines

Low and High Pressure Air Systems

Lubricating Oil Circulating Systems

Industrial Gas Piping

Solvent and Vacuum
Piping Systems

Water Pump

N-19

MEMPHIS PUMP AND MANUFACTURING CO., 140 Hernando Street, Memphis,
Tennessee has announced the production of their Pedemount pump,
designed for the many jobs that do
not require a pump of special specifications and construction. It is constructed of best quality grey iron,
stainless steel shaft, mechanical seal,
two ball bearings, and bronze enclosed impeller.



### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Drive can be by "V" belt or direct with coupling. Wide range of capacities and heads are available for the majority of jobs. Pump yields large quantities of water per horsepower. Pumping cost held to a minimumhigh efficiency.

### Electric Lift Truck

N-20

THE MARKET FORGE COMPANY, 25 Garvey St., Everett, Mass., announces the
availability of a new improved
"Load-Mobile" electric lift truck. The
item is applicable to plants and
warehouses wherever materials handling problems are encountered.

The basic design of the improved machine remains the same as in previous models. Most changes have to do with easier accessibility to electrical equipment and auxiliary equipment such as the lifting ram and the hydraulic pump used for lifting.

New features include a high-low switch for easier maneuverability in close quarters; spring-mounted casters to increase stability; freer use of sealed ball-bearings in the control system so that a light touch on the foot pedal puts the equipment in required position; a heavy roller chain operates the brake instead of an enclosed cable; the hydraulic lifting mechanism is arranged in a vertical



position at the front end of the hood where it is less likely to be damaged in transit over rough floors.

The device is available as a lift truck for conventional skid platforms; as a pallet truck for handling doublefaced pallets; as a freight and pickup truck; and as a tractor.



Special Formula for your particular Water ...

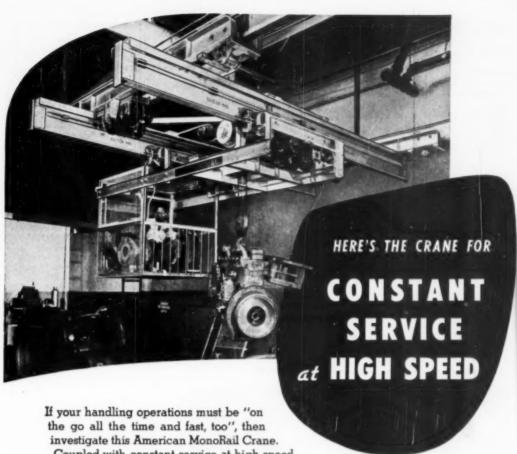
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• ARRESTS corrosion + pitting in OLD BOILERS +

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it offers the advantages of easy movement, rugged construction, low-cost operation and quick installation. But the No. 1 advantage is articulated trolleys. When each trolley wheel carries its share of the load in perfect alignment with the craneway tracks and all possible friction is eliminated, the result is perfectly articulated trolley travel. Applied to American MonoRail Cranes, these articulated trolleys permit operating speeds of 500 feet per minute and constant service. Breakdowns are practically eliminated and the crane is ready for fast service at all times.

An American MonoRail engineer will gladly give you all the details, or write us about the American MonoRail Constant-Service High-Speed Crane.

THE AMERICA

13105 ATHENS AVENUE

CLEVELAND 7, OHIO

### Air Blast Heaters

N-21 EDWIN L. WIEGAND COM-PANY, 7563 Thomas Blvd., Pittsburgh 8, Pa., has developed a new series of Chromalox air blast heaters.

Individual heaters are assembled in banks to form sections of various sizes which are welded in one large frame for mounting in air ducts. Heaters have Monel sheaths and fins te prevent corrosion caused by moisture in the air passing through the ducts. All metal parts of the frame are primed with a rust-prevention under-coating before painting. Provision for thermal cutout and thermostatic controls can be made in the fabrication of the heaters.

### Variable Speed Drive

N-22
The Speed Control Corporation, 1450 E. 289th St., Dept. C-12, Wickliffe, Ohio, has added to its line a new variable speed drive rated at ½ hp in non-reversing (reversible if desired) and 1/3 hp in reversing model.

Free additional information is available to readers of Southern Power & Industry. Check item code number on the postage free service coupon post card provided on p. 17.

The unit consists of a standard a-c squirrel cage motor, two standard d-c motors and a differential gear box. The a-c motor is coupled with two d-c motors through the differential gear box. The d-c motors are connected in a closed loop and require no outside d-c source of power.

Maximum output speed of the nonreversing model can be supplied from 250 to 1000 rpm for direct coupling. Minimum output speed in all cases is zero, although motors are not stopped but continue to run. Maximum torque is obtained at zero speed with gradual decrease as the output speed increases, until at the rated speed the torque assumes the rated value.

FROMTIER INDUSTRIES INC.

318 BARCOCK ST.

BUFFALO, N. Y.

### Annealing Pot Dumper

N-23

TOWMOTOR CORPORATION,
1226 East 152nd St., Cleveland 10, Ohio, has developed an annealing pot dumper, which
is an unusual variation of the revolving barrel grab, for materials handling. The new device picks up, rotates, and dumps heat-treated metal
parts.

In operation, it picks up a pot of castings after it has been removed from the annealing oven and cooled, carries the load to a shake-out table, inverts the pot of castings over the table, and places the inverted pot on the table.

After the pot of castings has been shaken out to empty it, the lift truck picks up the pot, rotates it to an upright position, and places it on a conveyor which returns it to the annealing department for further use.



ors, and other machinery. Or ... you can install

technical assistance on lubrication problems.

Manzel representatives will gladly supply

them on present equipment.



The annealing pot dumper has a capacity of 2,100 lb at 30" load center. Height of lift is 108" and the over-all lowered height is 83½". To protect the lift plunger from pitting and scoring by dust and abrasives in the air, the unit is equipped with a tubular steel hoist protector.

### Thermocouple Vacuum Gages

N-24
GENERAL ELECTRIC COM-PANY, Schenectady 5, N. Y., has announced a redesigned line of thermocouple vacuum gages for industrial and laboratory use.

Included in the line are a 115 volt, a-c, portable thermocouple vacuum gage, and types for both rack and panel mounting. All but the rack-mounted type have been designed to operate either from 115 volt a-c or from No. 2 flashlight batteries.

Usable on either glass or metal vacuum systems, the gages give a continuous indication of pressure and respond almost instantly to pressure changes. Pressure can be read directly from a scale calibrated from 0-200 microns, In the 1-100 micron range, the instruments are accurate within 10 per cent of the reading or 1 micron, whichever is greater.

### Steam Trap

N-25

ARMSTRONG MACHINE
WORKS, Three Rivers, Mich.,
is now making available a
small inverted bucket steam trap
which has a brass strainer built into
the body.

This side-inlet, side-outlet trap is used for draining smaller sized equipment producing relatively small amounts of condensate such as sterilizers, jacketed kettles, unit heaters, steam headers, and risers.

The built-in strainer feature eliminates separate strainer, extra fittings, and installation labor. These traps are said to cost less than a comparable standard trap plus a separate strainer.



The model is available for ½" or ¾" pipe connections; 150 psig operating pressure; 450-690 lb/hr continuous discharge hot condensate capacity; 5¾" height; 5" diameter, 5 lb weight; cast semi-steel body and cap; 18-8 stainless steel bucket.

### Steam Generators

N-26 go, New York, has introduced a new addition to its automatic line of package type steam generators. The new model has the versatility of being fired either with light oil, heavy oil, or gas, and the combination of gas and oil operation. Available in pressures from 15 to 200 psi, unit comes fully equipped with an integral burner, automatic safety and operating controls, steam trim, valves and other equipment.

The units are fully assembled, piped, wired and test fired for performance before shipping. The entire boiler surface is insulated with fibre glass over which is fitted a metal jacket. The only connections required before operation are water, steam, fuel, and electric. No stack is

required. A simple flue vent to conduct the exhaust gases outside the building is sufficient, but local regulations must be observed.

### Diesel Engine

N-27

The Baldwin Locomotive Works, Philadelphia 42, Pa., has announced a new series of diesel engines ranging in capacity from 700 to 2080 bhp. These engines are four-cycle, 17-in. bore, 20-in. stroke, with speeds of 257 to 375 rpm. They are available with 6 and 8 cylinders, normally aspirated or supercharged.

The engine is intended for electric power generator drive, pumping service on oil or gas pipe lines, municipal water pumping service, and other stationary power services.

New design features are welded construction of bedplate, frame and cylinder housing; the use of double wall cylinder liners with individual water jackets; and four accessible water jumpers which conduct the water from each cylinder liner to each cylinder head.



DAVIS REGULATOR COMPANY 2507 So. Washtenaw Ave., Chicago 8, III.

ASK FOR NEW CATALOG A-50

AUTOMATIC PRESSURE, PLOW, AND LIQUID LEVEL CONTROLS SINCE 1875





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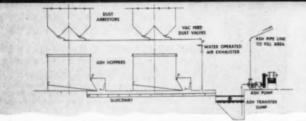
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DESIGNERS - MANUFACTURERS - ERECTORS BULK MATERIAL HANDLING SYSTEMS

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### Electronic Instruments

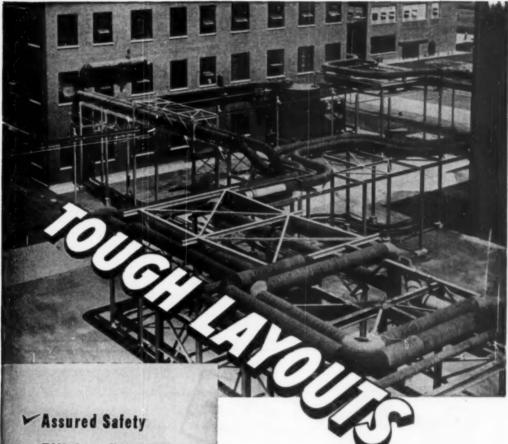
BRISTOL COMPANY. The N-28 Waterbury 20, Conn., has developed a new line of strip-chart electronic instruments. The unit is a high-speed, selfbalancing a-c bridge designed for measurement of temperature, resistance, conductivity, strain, position, inductance, pressure, force, or any other variable which can be measured in terms of impedance. In addition, the instrument can be used for electric power totalization and as the receiver for the company's system of telemetering.

### Concrete Saws

CLIPPER MANUFACTURING N-29 COMPANY, Concrete Saw Division, 2800 Warwick, Kansas City 8, Mo., has announced three new portable concrete saws.

Cutting speed is 12 fpm in asphalt, and up to 5 fpm, 1 inch deep, in limestone concrete. The maximum depth of cut is 61/2". A selection of metal bonded diamond blades is available for sawing concrete with limestone, flint, or granite aggregate as well as asphalt. The saws are designed with gasoline or electric motors, depending upon use.





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NATIONAL VALVE & MANUFACTURING COMPANY . PITTSBURGH, PA

### Power Truck

N-30
The ELWELL-PARKER ELECTRIC Co., 4162 St. Clair Ave., Cleveland 14, Ohio, has developed a power industrial truck with a hinged platform whereby platform length may be reduced.

Overall length of the truck with platform in load-carrying position is 109 inches and with the forward end of the platform raised the length is 84 inches. Weight of the truck is 3670 pounds and its capacity is 4000 rounds.

The apron type platform is hinged at a line midway of its length. The



first half is secured in the usual manner to the truck's elevating mechanism. The outer half in lowered position rests upon a forward part of the platform underframe. The two platform sections are joined by specially designed hinges. In transporting the truck in elevators and other narrow quarters it is only necessary to lift the outer section into raised position.

### FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

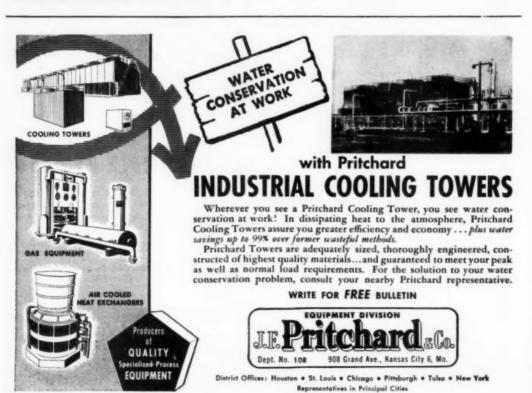
### Concrete Floor Hardener

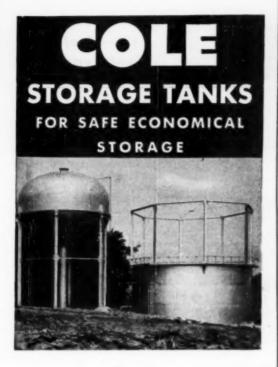
N-31 3645 Filbert St., Philadelphia 4, Pennsylvania, announces the availability of Flinterust Liquid which will help keep concrete floors in top condition. It requires no more labor or skill to apply than does swabbing a floor with water.



A concrete floor may look and even feel smooth. However, in reality the surface presents tiny hills and dales, as shown by the sixteen times enlarged micrograph. The hills or tiny tips, are quickly ground off by the traffic, exposing the softer, under-surface to more and more grinding off.

Flintcrust Liquid is flushed over the floor and is said to make the surface up to ten times harder, increasing the resistance to traffic abrasion. It also penetrates and fills the pores and prevents disintegrators, such as oil, grease, acids, etc.. from penetrating the concrete.





WHATEVER your needs in pressure vessels—creosoting cylinders, bubble-towers, gas scrubbers, pressure spheres, gas storage tanks, etc. — you can depend on COLE for vessels that are correct in design, and permanently leakproof at the welded or riveted joints.

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J. H. MENGE SALES CO., 309 Interactional Trade Mart, New Orleans, La.

1868-1950 BUT MORE MODERN THAN EVER



### Ventilator

N-32
THE SWARTWOUT COMPANY, 18511 Euclid Ave., Cleveland 12, Ohio, has announced a new centrifugal fan ventilator. The new product, known as the "Airlift", is designed especially for situations where powered duct exhaust ventilators operating at very low noise levels are desirable.

The power unit features a centrifugal type fan with backwardly curved blades, mounted within a weather-proof chamber. The streamlined fan bottom is said to increase efficiency while reducing turbulence to a mini-



mum and permitting slower operating speeds. Welded steel framework provides sturdy support for the unit which fits over curb built to extend duct rising from building roof. Fourteen sizes providing nearly 50 capacity variations are listed in the manufacturer's Bulletin 341.

### Flame Failure Safeguard

N-33 PORTION, 77 Broadway, Cambridge 42, Mass., has announced a flame failure safeguard for light-oil burners. The device is intended for use in installations having a capacity in excess of 5 gallons per hour.

Fireye System FF-1 has been introduced to provide flame failure protection for commercial gun type light-oil burners. In the event of light off failure, lock-out will occur 5 seconds after power has been applied to burner motor and electric ignition. This feature is essential in protecting against the hazard of pumping atomized oil into a hot fire box, should faulty electrodes cause failure of electric ignition.

### Southern Chemical Conference

(Continued from page 73)

cloth, yet one cannot apply this type of thinking to the plastics industry.

It is estimated that Du Pont invested over a million dollars in the basic research on nylon and it is obvious that large sums were also invested in the education of Dr. Carothers and his coworkers who were responsible for this development: Polyvinyl chloride, phenolics, polystyrene, urea and acrylic plastics are all living examples of the fruits of education and research.

There are still pessimists who consider investments in research wasted when its object is the replacement of natural products such as silk, wood, natural rubber and metal with improved materials. There are also optimists who visualize immense revolutionary plants combining coal, air, salt, and water in correct proportions in order to duplicate all natural products. Fortunately. there are still enough realists who recognize that the present plastics industry has been made possible only through the blood, sweat and Hewitt. Rakeland. tears of Carothers and other chemists. Such realists also know that technical manpower is the most important item required for the development of a still greater plastics industry.

The roots of the plastics tree are the raw materials which are so abundant in the South. A moderate investment will convert these roots to saplings which are the plastics intermediates. These intermediates will be transformed to the complete plastics tree in any location where nourishment in the form of technical manpower is readily available. Providing there is a continuous emphasis on education and research in the South, one may conclude that this region will reap its share of the fruits of this growing plastics tree.



DO YOU KNOW that the forces of advertising are engaged today in one of the world's greatest jobs of mass education ... in the public interest?

Do you know that these forces for good have been released through the vision and unselfish cooperation of American business – advertisers, advertising agencies, media owners and others?

Hundreds of advertising agencies have volunteered their planning and creative time and facilities. Artists, cartoonists, photo-engravers, printers, typographers and others have contributed their services.

Media owners have donated millions of dollars in space and time. National and local advertisers have sponsored and paid for many millions of public service advertising messages. As a result, the American people are being alerted as never before to the dangers which threaten from within and from without . . . the dangers of ignorance about our American economic system, intolerance, tuberculosis, school and teacher shortages, etc.

And, at the hub of this great public service effort is your organization . . . The Advertising Council.

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Right now The Advertising Council has 14 programs in operation. The success of these programs depends on the public spirited and generous cooperation of advertisers and media owners. Your help, in the form of space or time donations, will mean a lot to us. And remember . . . . What helps America helps you!

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Write for a copy of Booklet No. 15. It will give you pertinent information about The Advertising Council . . . how it started . . . what it is . . ., what it does . . . Or ask for material on specific campaigns. Address: — The Advertising Council, 25 West 45th Street, New York 19, N. Y.



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### shows you how to cut cleaning costs

THAT 16-page Digest above describes 71 important power-plant cleaning and related procedures in which specialized Oakite materials help reduce cleaning time . . . simplify repair and maintenance work . . . cut the cost of descaling, degreasing and cleaning. Here's a quick run down of its contents:

- use of Oakits materials in steam central systems
- how to prepare and use Oakite Compound No. 32 for equipment descaling
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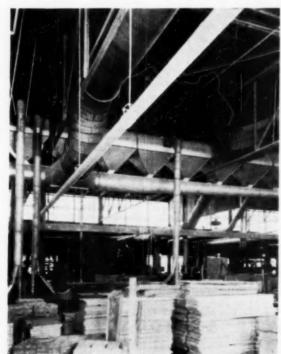
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J. F46, 132, and 134	Warren Steam Pump Co., Inc., 117 Western Precipitation Corp * Westinghouse Electric
	Corp

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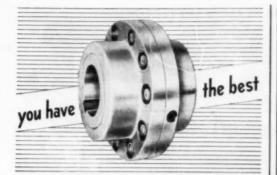
Raybestos-Manhattan, Inc.

Republic Rubber Division

Packing Division

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Wiggins Co., John B. ..... 138



when you install the reliable

# WALDRON "Granged COUPLINGS

To prove it just compare these "Series A" jobs with any other coupling of their type. Note the one-piece steel foreged cover sleeve, the emple lining up surfaces, the absence of trouble making parts, the compact design and similar features. Our Catalog 57 will give you details. Write for it.

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### JOHN WALDRON CORPORATION

New Brunswick, New Jersey

Sales Representatives in Principal Cities.





### Jubox & Jubalox

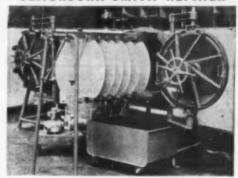
Simplified Anti-Corrosive Paint Systems

Self priming and interchangeable, Subax & Subalax lend themnelves to simplified and harmoniaus maintenance point systems since all varieties have one distinctive basic pigment, chemically active subaxide of lead (Pb,O).

Subax points provide maximum protection — are available in a range covering all phases of the electrical industry.



SAVE MONEY by clarifying condensed returns of all emulsified or free oils with BLACKBURN-SMITH REFINER

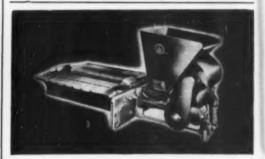


### **Outstanding Advantages**

Breaks tightest oil emaision in water
 Saves beet units and fresh water
 Reduces boiler maintenance costs
 Simple, incapensive operation

The REFINER represents an outstanding achievement in pressure leaf fillers, designed for extremely fine filtration and for the removal both emulaified or free oil from condensate down to less than I ppm. Existing installations prove beyond a doubt the effectiveness of the Refiner, which enables operators to re-use condensate formerly discarded because of the oil content. The saving of heat units contained water plus the savings accrued from the fact that less water is required when an oil-free condensate is returned, is worth an investigation.

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### UNEQUALED STOKER PERFORMANCE

The present-day Brownell Ramfeed Stokers incorporate the latest improvements along with the original basic design. Many years of experience have proved that this stoker leaves nothing to be desired in efficient, economical, dependable, enduring coal-burning performance. Made in standard and low-set models, the machines have

Made in standard and low-set models, the machines have capacities ranging from 75 to 560 boiler h.p. Each of the twelve sizes has eight feeding rates to meet load variations. Automatic control of coal feed and for air intake is available. The ram stops at innermost position to block gas blow-back, Fuel is evenly distributed and agitated for complete combustion.

Ask for Bulletins S-31 and S-32 describing these heavyduty stokers.

THE BROWNELL COMPANY
304 North Findlay Street • Dayton 1, Ohio



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LIVINGSTON, N. J.

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